Timothy Claxton

MEMOIR OF A MECHANIC.

BEING A SKETCH OF THE

LIFE OF TIMOTHY CLAXTON,

WRITTEN BY HIMSELF.

TOGETHER WITH

MISCELLANEOUS PAPERS.

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PREFACE.

The sketch of the life of Mr. Timothy Claxton, which I have the pleasure of presenting to his friends and the public, has been for two or three years in the course of preparation, having been delayed from time to time, in the expectation of receiving additional materials from him. We have now received documents, the addition of which, we believe, will greatly enhance the value and interest of the book. His affairs in England being for the present established, it has been thought best to defer the publication of the work no longer.

Mr. Claxton is a man well known and much respected among us, not only as an industrious and ingenious manufacturer of school and philosophical apparatus, but as a zealous and efficient promoter of the cause of popular im-

provement, especially among the mechanic classes.

The papers from which this volume has been compiled were entrusted by Mr. C. to my care, as an intimate friend and associate, on his leaving this country in 1836, with the permission of making such selections for publication, and such verbal corrections in the matter, as should be judged proper. The first part, or Memoir, is, in fact, an autobiography, which has been re-written from a sketch first published in the Young Mechanic, (a periodical some time since printed in this city,) entitled "Memoir of a Mechanic," and continued by the author up to the present time.

"It was thought by my friends," he says, "that it would be useful towards the encouragement of young men who, like myself, begin the world poor, and deficient in education; and also in showing, in some degree, what may be done by industry, perseverance and economy of money and time, by those who are obliged to leave school at an early age, to attend to some mechanical occupation as a means of subsistence."

Similar motives have since led to the completion of the Memoir to the present time, blended with such accounts of institutions for the improvement of mechanics and others, as it might seem proper to insert—and to its publication in the present form.

To the Memoir has been appended a selection of Miscellaneous Papers, consisting chiefly of articles written by him, serving to illustrate the subject matter of the Memoir itself, and to set in a clearer light some things which were there but slightly touched upon. The most important of these articles, is an account of the origin of Mechanics' Institutions, which, though brief, is interesting, and, we have reason to presume, more accurate than any which is already known to the public in this country.

As to the manner in which the task of preparing this volume has been performed, it may be remarked that the matter of the Memoir has been altogether newly arranged, and divided into chapters, for the sake of perspicuity; though, with the exception of slight verbal alterations, and indeed a sentence here and

there added, where the abruptness of the original made it necessary, the language is entirely that of Mr. Claxton himself. His style, it will be observed, is a matter-of-fact style, dry in the extreme; and yet so simple, honest and straight-forward, as to be interesting on that very account.

The likeness which fronts the title-page was engraved on steel in London, from an oil painting by Mr. S. S. Osgood, of Boston, which has been procured since Mr. Claxton's return to England. The small air-pump is represented in the engraving, as being the germ, as it were, of those subsequent improvements and inventions by which Mr. Claxton has so favorably distinguished himself.

It is but just to add, in conclusion, that having been unable, on account of my business engagements, to devote that time to this work which I should have been glad to do, I have been very materially assisted in it by Mr. D. H. Howard, a scientific friend of mine residing with me, who was also on terms of intimacy with Mr. Claxton, before he left this country.

The result, such as it is, of my efforts to do justice to my absent friend, and thereby to encourage my fellow mechanics in the noble work of self-improvement, is respectfully submitted to the public.

THE PUBLISHER.

Boston, June, 1839.

MEMOIR OF A MECHANIC.

CHAPTER I.

CHILDHOOD.

Birth and parentage. Early education. A benevolent lady. Occupations. Disposition. Anecdotes.

I was born in England, the 22d of August, 1790, at Earsham, Norfolk, near Bungay, Suffolk, about one hundred miles from the metropolis. My father's name was Thomas Claxton. He was for thirty-five years a gardener at Earsham Hall, in the service of three successive employers of the family of Windham.

My parents, though poor, were honest and industrious. Neither of them could read or write; and feeling this deficiency in themselves, they were determined to do what they could for their children, (five in number, two older and two younger than myself.) They

put me, at the age of five or six years, to a school kept by a woman; and at seven, I was sent to a school-master, whose name was William Simpson, in the adjacent market town of Bungay, for two years, except during harvest time, when I was taken away to assist my mother in gleaning, which is a great help to the poor in that part of the country.

My schooling was paid for by a benevolent lady, the Hon. Mrs. Windham, (she being the daughter of a lord, and the wife of a country squire,) who, while she lived, kept six boys and six girls at school for two years each; one half of whom left school every year, to make room for new ones. I feel it my duty to record the goodness of this amiable woman. She not only instructed the ignorant, but fed, warmed and clothed those who were in need. I made the best of this opportunity to get a little learning, which was confined to reading, writing and arithmetic; and was tolerably quick at the latter. When I left school, I had reached the Rule of Three; being then about nine years old.

Sometimes it was difficult to find suitable children to send. In my own case, I was sent a year earlier than usual, to fill a vacancy occasioned by a boy being dismissed from school, after three months' trial. He was a

dunce, and in the habit of playing truant. This the master could not allow, as his credit was at a stake; for this lady obliged him, with his twelve scholars, to attend at her mansion every year, where each used to read and answer questions. She would inquire of those about to leave school, what books they had; and order the master to furnish them such as she thought they needed most. After this ceremony was over, she gave each of us a shilling, and told us to proceed to a room where we sat down to a sumptuous dinner, and were attended by the servants.

My father, being a day-laborer, had no particular employment for me; so to keep me from mischief, after I left school, I was set to spinning wool by hand, a year or more, after which I was released to take care of a flock of sheep, which fed by the road-side in the daytime, and were turned into a field at night.

I disliked this employment very much, from fear of losing any of them; and I often counted them many times a day. They often broke into other persons' enclosures. At such times they were very noisy: the old ones would call their young towards them, whenever they were about to leap a fence. In fact, I became so tired of their noise, that the bleating of a sheep gave me pain for years afterward.

I was next engaged to work in a garden for supplying the market with vegetables, until I was between twelve and thirteen years of age, when I was apprenticed to a trade.

I was tender-hearted, timid, and very bashful. Still, I was not deficient in courage, when put to the test; but it seemed to lie dormant, until called forth by some emergency. This disposition, which, in a modified form, has clung to me through life, prevented my being an assailant, but was very useful when I was placed in the situation of a defendant.

I used to get as far out of the way as I could, when my father had a pig killed, or was putting a ring into the nose of one; for I could not bear to hear the cries of these or of any other animals. So, when I see horses going up hill where it is slippery, I am sure to turn my head another way. And yet I have witnessed executions at the Old Bailey, though it has cost me some feeling; and I have frequently gone out of my way, to avoid the sight even of the preparations.

I was so timid that it was a great trial for me to go into lonesome places after dark; but I was put to the test one night, by a young man who tried to frighten me, by way-laying me on my way home, while I was an appren-

tice. He concealed himself in a lonely place, and when I came nearly opposite, he began creeping on his hands and knees towards me, having a dark, shaggy coat on, with the cape drawn over his head. He expected I should run, and then he could run after me; but I crossed towards this unsightly object, and touching it with the end of a small stick, soon found it was a substance of some sort, when I was relieved from my suspense by my gentleman standing up and laughing. I laid my stick on his back, and said it was well for him I had not a larger one with me.

At another time, a strange young man took my walking stick from me, by watching his opportunity, while I was seeing the volunteers go through their manœuvres on Bungay Common, one holiday. He was much older and stronger than I, and I gave it up for lost, not having any person with me who would interfere. But about half an hour afterwards, when the companies had been dismissed, I saw the man, with my stick, sitting on the stocks in the market place, between several other strangers from out of town. I went up to him, and demanded my stick; but he only laughed, when I seized it with both hands, giving him a push backwards, and with a sudden twist, wrenched it from him. He did

not rise from his seat, and the other men laughed heartily, which made him look very foolish. This little feat shows that the consciousness of right strengthens the weak, while the guilty are easily confounded.

CHAPTER II.

APPRENTICESHIP.

Arrangements. Benefits of a little learning. A useful friend. An intelligent journeyman with an ignorant master. An attempt at clock-making. Writing and composition—Advantages of practising them. Drawing. Apprenticeship happily ended.

My father had some notion of putting me to the trade of a painter and glazier; but I did not like the idea of working on ladders and temporary stages, suspended in front of lofty buildings. I had, finally, to decide between the trades of a carpenter and a whitesmith. I made choice of the latter, and was apprenticed to Mr. John Bobbit, at Bungay; and I do not recollect that I have ever regretted it, although I have practised that and similar branches for more than thirty years—commencing April 6, 1803.

My agreement was to serve seven years, and receive a certain sum weekly as wages; and if I served my time out duly and truly, my master promised to give me ten pounds.

My father was to find me in board, lodging and clothing; and as he lived about a mile from my master's shop, I had that distance to walk every morning and evening. We worked from six in the morning until seven in the evening, taking out an hour and a half for meal times. On Saturday night, we left work at six o'clock.

I had not been long at my trade, before I found the benefit of my schooling. There were two other apprentices, much older than myself, neither of whom could take an account of the work as it was delivered from the shop. The foreman was very glad to put this task upon me; and I was as willing to do it. The master was engaged in his sale-shop, (hardware store.) and the apprentices were occasionally called upon to assist when he was absent, or on a market day. This, together with the great variety of work done in our shop, afforded considerable scope for the abilities of any young man. We either made or repaired almost every article made of metal used about a house, whether in its structure or in domestic affairs, together with tools used by mechanics, and some work for mills.

The first money I received was at Christmas time, when the apprentices have the privilege of calling on their master's customers for

a Christmas box. My share was about half a guinea, with which I bought a Bible containing the Apocrypha, (as I wished to have it complete,) and a thick cyphering book. At the beginning of the year 1804, I began arithmetic anew, going through more thoroughly than I had done at school—writing in every rule and case, and using a greater variety of examples.

I sought advice and assistance from anybody and everybody that came in my way. One of the most efficient of my advisers was a journeyman carpenter. He had several books full of examples in mensuration of superficies and solids, embracing the methods of measuring various kinds of artificers' work. The figures or diagrams were very neatly drawn. I had several lessons of an evening from this man; but he was soon taken away, having to undergo a surgical operation. He died a few days afterwards.

I never was more sorry at the loss of a relation, that at losing this man, as I had made up my mind to study as much as I could with him. His books were purchased of his widow, by his employer—a numb-skull at writing, whose accounts were kept by his wife.

This employer used to delight in teasing his journeyman about his knowledge. "Tom,"

said he, sitting one day at a tavern, "there is a coach going by: tell me how many times the hind wheel will turn round in going to London." "Give me the size of it," was the reply. "Oh, any fool can do it so: you ought to tell without that." He was often treated so in company, by way of derision. Thus people undervalue what they cannot reach.

Sometimes, however, poor Tom had the advantage over his employer. The lady I have spoken of wrote to the carpenter, on a certain time, requesting him to build a pheasant house, to be placed in a shrubbery near the mansion. The form was to be a hexagon, if the thatcher could thatch it of that shape. He soon began to coax Tom, to get him into a good humor; for he verily believed him to be the only man from whom he could learn the number of sides in a hexagon. Tom referred him to his brother John and others, but to no purpose. At last he told this very cunning man the number of sides it contained. By purchasing Tom's books, he expected to be able to beat everybody in the neighborhood. I wished to obtain them; but that was impossible.

My leisure time was now devoted partly to study, and partly to mechanical pursuits. I made several curious articles during my apprenticeship, of which the one of most conse-

quence was a clock. The death of my friend above-mentioned gave me an opportunity to purchase a small bench vice, and some other tools, of his widow. I made myself a small lathe, chiefly of wood, and several other tools, before I commenced on my clock. It was in the examination of a large church clock that my attention was first drawn to the subject. The wheels being large, it looked more simple than a common clock. The principal difficulty I apprehended was in the motions necessary for the hands, where some of the axes pass through the others. The materials to which I had access were not very suitable for the work; however, I commenced operations.

It will be understood that, as I lived so far off, my meals were taken in the shop—my mother putting what was necessary for me to take every morning into a small basket. This plan gave me considerable time to prepare those parts at the shop that I could not do so well at home. My master never expressed any objection to my amusing myself in this way: in fact, he did not trouble himself about it. I prepared two plates of sheet iron for the frame. These were kept at a suitable distance apart by four pieces of iron wire, which were riveted into the back plate. The front plate

was movable. These plates were bushed with brass, wherever it was necessary for the pivots of the several axes to pass through them. This, in point of utility, was as well as though the plates had been made wholly of brass. The wheels were of sheet brass, cut from the bottoms of old brass kettles. It was too thin, but it was the best I could get. Having prepared my wheels, and fastened them on pieces of wire, the turning, dividing and cutting the teeth were performed at home.

I often smile, when I think of the scene which presented itself, when I first began. It was winter time: my mother was sitting on one side of the fire, and the other was occupied by some other members of the family. As it was very cold, that part of the table farthest from the fire was vacant. I screwed my vice on this side, and pinched my lathe in the vice; putting my axle, with the wheel on it, between the dead centres of the lathe. The motion was given by a drill bow, the string of which passed round a whirl, placed temporarily on the axis. This bow is moved by the left hand, while the tool is held firmly in the right. In this manner, the wheels, pinions and pivots were all turned. The dividing was done by a pair of small spring dividers; and the teeth were formed with a file.

Parts of the work required hammering. This was more than some of the family could endure; and it induced them to furnish me with a separate light, and I had to decamp. I found a place up stairs, screwed my vice to the banister rail, and, with a piece or two of board, I formed a bench; and I was now fixed for the winter.

The following summer, I fitted up a much better establishment in a shed in the yard, where I completed my task, to the wonderment of all the old ladies in the neighborhood, but not exactly to my own satisfaction; although it was as well as could be expected, taking all the circumstances into view. It kept time tolerably well, and would show the hour and minute on the front dial. It had an hour hand on each side: I had never seen this before, although I had heard of it. The weight moved only thirteen inches, and required winding up once in about four days and a half.

It is impossible for one who has never tried it, to conceive what pleasure there is in attempts of this kind, especially when the mind marks out tracks that have never been trodden before. Sometimes months, and even years must elapse, before the object of our pursuit can be brought to an issue, during which time

there is a strong belief that the thing can be accomplished; although many unforeseen difficulties occur, which set us to thinking still more earnestly. Now and then a faint ray of light seems to point out the course we must pursue: by and by, a blaze, as it were, bursts upon us; and the object can now be accomplished with ease. This brings pleasure somewhat in proportion to the labor spent in searching for it; or according to the benefit likely to arise to mankind, or to the individual making the discovery; modified, of course, by the disposition of the person engaged in the operation.

Many times have I been thus bent upon the accomplishment of some object that required great attention, which I found was more easily done in the night, when the family had retired to rest, and all around was still. At such times, sleep would be banished from my eyes; there being something so fascinating in my pursuit, that the time flew unconsciously by; and I retired to bed, rather to prevent the interference of others than for the sake of rest.

Though my father, as I have already mentioned, could neither read nor write, he was very fond of hearing all his children read: indeed, he made it a practice to hear us read the scriptures, every Sunday after dinner. He

sometimes had letters to write, most of which, during my apprenticeship, fell to my lot. At first, he used to dictate what he wished to have written; afterwards he only gave me a general idea of what he wanted, and left the rest to my discretion. The neighbors would also occasionally get me to write for them. This gave me confidence; so that, although a bad writer to this day, I have not been very diffident in committing anything with which I was acquainted to paper.

I now feel, more than ever, the benefit of thus early attempting to write short epistles, or essays. Having some acquaintance with the periodical press, I know the difficulty of getting young men, not only among mechanics, but in all classes, to communicate what they know. They have leisure enough, but the task is too hard, because they have never been used to it.

I had considerable patience with anything that I undertook willingly. For instance, my father borrowed a book containing two sermons, a prayer, and some other short pieces. He was very fond of it, and did not know how to get a copy. I offered to write a copy, if he would find the paper. This occupied my leisure time for several weeks; but I finished it, in spite of the jokes of my compan-

ions; for it was no easy matter to turn me from anything I had set my mind upon.

I had some taste for drawing; but found it difficult to make much progress, situated as I was. Gaudy pictures were much more easily made than correct representations: however, by perseverance, and having a better chance as I grew older, I succeeded in mechanical drawing to my wishes; and also tolerably well in the ornamental department.

From what has been said, it may be thought that I always had business enough on hand to keep me from mischief. I have sometimes, however, engaged in the excesses common among young men; but soon something disagreeable would happen, and then I would return to my more innocent, as well as more profitable amusements. I used to be glad when a holiday occurred, for then I could do more than in many evenings.

Thus passed away my seven years' apprenticeship. I served my time out "duly and truly," and my master gave me ten pounds with my indenture. He asked me what I was going to do. I told him I was going to London. "Well," said he, shaking my hand, "keep your right hand forward, and you will do well."

CHAPTER III.

RESIDENCE IN LONDON.

Manner of spending time. The industrious find enough to do. Experiments on perpetual motion. Ingenious mouse-traps. Female acquaintance. New friends. Marriage.

I ARRIVED in London in April, 1810. Here many new scenes were presented to my view. In such a place, among so great a variety, it is difficult to confine one's self to what is most beneficial. My habits were fixed, however, and I adhered to my former plans. It should be understood that I had been bred up in a part of the country where agriculture is the chief employment of the people; that I had seen very little of manufacturing or of machinery; that, in fact, I had never seen a steam-engine, nor heard a lecture on any branch of science, nor even seen a book on any subject connected with the arts and sciences, except one on geography, borrowed for a short time.

Such was my situation, when I visited the metropolis. I obtained work immediately:

and I may here observe that, to this day, I have never been without regular employment, except when I have been travelling for my own pleasure; nor even then but for short periods.

It was nearly two years before I adopted any regular system of passing my leisure time, most of which was spent in visiting places of note, or objects of curiosity. About this time, I procured a good lathe, and some other tools. Now, also, I had engaged a partner for life; and having a home where I could amuse myself in my own way, I pursued from this time a regular course; sometimes making various mechanical contrivances, while at others I practised drawing. The latter is a very good amusement for a young mechanic. It helps him to understand what he reads, as the engravings in books become easy to his comprehension. It also habituates him to nice observation, assists his memory, and is the cheapest amusement I am acquainted with. It makes very little noise or dirt; and by having things portable, they may be got out and packed away in a very short time. Drawing is more or less useful to all; and is essential to the successful practice of some trades.

I was at this time employed in a large machine shop, belonging to the celebrated John

Braithwaite, among men from various parts of the country. In such a place, many valuable ideas may be picked up; but great care is necessary, for there are so many erroneous notions prevailing among workmen generally, that a young man may easily be led astray. An error among many of them was a belief in the possibility of finding out the perpetual motion, or of constructing a self-moving machine. I labored for some time under this delusion, and spent much time in the pursuit of what I am now perfectly satisfied cannot be accomplished.

My first attempt was, to make the descending side of a wheel heavier than the ascending side, by causing movable parts to approach and recede from its centre; but let me modify it as I would, there were always a greater number of these movable parts on the ascending side, so that, though they were made to recede further from the centre after passing the top, they were fewer in number on the descending side, and the wheel would turn as well backwards as forwards. Many other methods were tried—some of them with fluids. A syphon was made with the short leg much larger than the long one, that it might contain a greater weight of water and over-balance that in the long leg; but I found it was ne-

cessary that the discharging end should be lower than the surface of the water in the vessel, whatever might be the form of the syphon.

I can hardly tell whether the following whim of mine is worth relating:—A young man made a box trap for catching mice, and was showing it as a specimen of his ingenuity. "Now," said I, "if you had made it so that after the mouse was caught, he would set the trap ready for another, and then go and drown himself, it would have been worth something." "That is impossible," he exclaimed; "that is more than you can do." I told him I would produce one in a fortnight's time: and so I did; and after that another, more simple than the first.

These mouse-traps were pronounced to be the greatest curiosities in my collection, which was tolerably large. The first trap consisted of a box, open at one end, with a wire grating at the other. When the mouse entered the trap, and began nibbling the cheese, the door at which he entered would fall down. There was a hole in the side of the box, on pushing his way through which, he raised the end of a lever, which started some clock-work placed on the top of the box, by which the trap was set again; while the noise of the wheels would

so startle the little fellow, that he would run up inside of a spiral tube, into a jar of water, before he was aware of it. In the second trap, instead of clock-work, it was so contrived that the mouse would set it by turning a hollow wheel, like a squirrel cage. After entering the wheel, he must either work, or stop there; but the instant the trap was set, a little door opened on one side of the wheel, when he would escape from it, to be let down by a trap-door into the water.

The first time I saw my destined wife, she was taking a walk in company with another female, a neighbor's daughter, who attracted my attention. I introduced myself to the latter, who was the taller of the two, and whose features were rather striking, at first sight. After a little conversation, we took some trifling refreshment together, which is a common thing at the various tea-gardens in the suburbs of London, during the summer season, with both young and old, among the middling classes of society. I then escorted the ladies nearly home; and we agreed to meet again the next Sunday afternoon.

The few minutes we had spent over our refreshment were sufficient for me to discover a vast difference in the manners, as well as

the circumstances of the two females. The taller one was continually calling the other "Miss Hannah;" and not having much else to talk about, she began upon home affairs, such as, "My mother is coming to your house, Miss Hannah, to-morrow morning early, to wash;" "My father has not much work to do," &c. In short, enough was said to give me an insight into the relative condition of the two families; that the family of the tall one was supported, in part, by the family of the other, and that Miss Hannah, being of an affable and sprightly turn, was allowed the indulgence of going out occasionally with the other, but was plainly dressed, to avoid attraction.

Here, I thought, was a chance of being connected with a respectable family. Our weekly meetings were continued for about two months, when I thought it high time to see how the parents felt about the matter; although I was not entirely in the dark about it, as I understood that a favorable impression had been made in the right quarter; but still, the lady hesitated about introducing me at home. Things had now been carried as far as was prudent, before advising with her parents; and I, to cut the matter short, wrote a letter to the lady's father, telling him how

long I had been acquainted with his daughter, who I was, and what were my intentions; observing that the acquaintance had better proceed no farther, unless it met with his approbation. After a few days I received the following answer:

"SIR:—Your letter of Wednesday evening I have read over to my wife and daughter Hannah. All of us are well pleased with your candid proposal of becoming allied to our family. If you please to call on me at 113 Bunhill Row, on Sunday next, at eleven or half past eleven o'clock, I shall be glad to see you, and have leisure for nearer conversation. Generally, we dine about two o'clock, when your partaking of our family fare without ceremony, will oblige us."

I waited on the good gentleman at the appointed time, and spent a very agreeable day with the family, which was large and quite interesting. That there should be no mistake about my being welcome at the house, the father sent me, a few days after, the following note:

"SIR:—If you can make it agreeable to yourself, and take a bit of dinner with us to-morrow, by two o'clock, we shall be glad to see you. Come as early as you can make it convenient."

From this time I had a general invitation; and there was only one difficulty in my way, which I luckily escaped; although many a one has found it unfortunate to have been placed in a similar situation. I allude to a young man's being suddenly introduced among a number of females, all possessing charms of various kinds, so bewitching that it requires some resolution to keep the affections from wandering. But as I never delighted in wounding the feelings of any one, it seemed impossible for me to do so to a confiding female, who was in every respect worthy of my tender regards. As my plans were upon a moderate scale, it did not take long to mature them; for we were married in four or five months from our first meeting; and by mutual endeavors to please, as well as by mutual forbearance, we have lived together more than a quarter of a century, with much less jarring than is generally experienced: and yet we have had some trials, having lived under three different governments, and travelled about ten thousand miles together.

CHAPTER IV.

SCIENTIFIC IMPROVEMENT.

A new field of thought. Scientific lectures and studies. Formation of the Mechanical Institution. Its history.

I HAVE now arrived at what I consider the most important period of my life. Up to this time, I had had no instruction, after leaving school, but what I could get in a very uncertain and precarious manner; when, being just turned of twenty-five years of age, I happened to see a notice of a course of Lectures on Natural Philosophy and Chemistry, by Mr. Tatum. The very names of the subjects to be treated on, such as Pneumatics, Hydrodynamics, Aerostation, &c., were all Latin to me. On farther examination, however, I found under the various heads, some account of the experiments illustrative of steam-engines, and other things that I wished to be acquainted with. I bought a ticket; and was so pleased, the first time, that I took notes of the lecture, and some sketches of the apparatus, (for I was

seldom without my pocket book and pencil.) On returning home, I sat up very late, to write out all that I could remember of the lecture. I continued to attend these lectures weekly, from October, 1815, to the April following, taking notes of all that was important to me.

The following summer, I procured a book on Natural Philosophy, which contained an account of the various things I had seen in the lectures. I also made many articles with which I tried experiments; and I succeeded so well as to be induced to attend a second course of these lectures, besides several others, given by different persons.

At length, I applied for membership to a philosophical society; but not having friends enough at court, I was not received. This did not turn me aside from my pursuit, but stimulated me to use all my efforts to improve the class to which I belonged. No—it made me redouble my exertions. I reasoned thus: I am a mechanic; that is the difficulty. Well; suppose the mechanics should be invited to form themselves into a society for mutual improvement. This was suggested to a few persons; and with their approbation, I got a circular printed, and distributed it, inviting those who felt the want of information to come forward. A society was formed, with the title

of "The Mechanical Institution," which lasted about three years, and then dwindled away, leaving the few persons who began it in possession of what books and apparatus had been procured for its use.

The first movements in this affair were made in 1816, but the society was not organized till August, 1817. I performed the duty of secretary to this society the whole of the three years it was in being. The meetings were held weekly, first in Brooks' Market, then at the Three Compasses, in High Holborn, and lastly at my house in Little Sutton Street, Clerkenwell. The exercises consisted of lectures and discussions on subjects relating to the arts and sciences, and sometimes social conversations on various subjects.

Not having a library of our own, we subscribed two guineas per annum to Horne's celebrated library, which allowed us about twenty volumes daily, but which was afterwards reduced to four volumes, for the use of those members who were engaged in the preparation of lectures.

The Rules, &c. of the Mechanical Institution were printed in a pamphlet form. A notice of it is given in the London Mechanics' Magazine; and it is thereby kept from oblivion, as it ought to be—for I am sure the efforts of

several of the members deserved better success. But it was hardly possible to enlist persons of talent and leisure to assist us, although invitations were given to such, in a printed circular. I am of opinion that the decline and extinction of the society were owing principally to a want of taste and experience in these matters.*

It is astonishing, though true, that the great mass of mechanics do not appreciate knowledge as they ought. They do not go forward themselves, and can hardly be persuaded to partake of the repast it offers, after everything is prepared for them; so that it becomes those who have drank at the fountain of knowledge, and know its efficacy, to go forward and do all they can for its general diffusion; for there is nothing that we could do that would have so great a tendency to alleviate the miseries which are felt by the great bulk of mankind.

* The notice of this society in the London Mechanics' Magazine, referred to on the preceding page, with some other things relating to it, will be found among the Miscellaneous Papers.

CHAPTER V.

RESIDENCE IN RUSSIA.

Arrival at St. Petersburg. Description of the building in which the writer was employed. Difficulties. Their settlement. Recommendation. An accident. A threatened explosion. More scared than hurt.

In June, 1820, I left London for St. Petersburg, in Russia; at which place I arrived after a passage of eighteen days. We left the ship at Cronstadt, and proceeded to St. Petersburg in a steamboat. It was about eight o'clock in the evening when we came in sight of the city. The sun, of course, was low, and his rays had a fine effect on the bright steeples and splendid domes of the public buildings, all shining with metallic lustre, so that, during a sail of five or six miles, we had as grand a sight as I ever witnessed. It was light enough to see to do ordinary work out of doors all night, for several weeks after I arrived.

I was sent out with apparatus for the production of oil gas, for the purpose of illumina-

tion. The building in which I was engaged in putting up the gas works was one in which the business of the Russian army was transacted. It was built in the form of a crescent, having a large arch in the centre, and was situated opposite the Imperial Palace. The area between these two buildings was used as a parade ground for the soldiers every morning.

In this building were several departments, with a general at the head of each, some of whom were employed over several hundred clerks. The library was very extensive. We put up a splendid chandelier in the centre of the room appropriated to it, which cost four hundred pounds sterling in England. It had three hundred and sixty jets of gas, issuing from a circle of brass seven feet in diameter, above which were four eagles, lit with gas. There was also a great quantity of richly cut glass about it. In this building I saw lithographic printing for the first time: copperplate and letter-press printing were also carried on here; and a very extensive establishment for the manufacture of mathematical instruments; —all belonging to the government: likewise a drawing school, consisting of about two hundred young officers.

One ingredient in my constitution—the disposition to resist imposition and coercion—was

called into action more by the treatment of the agent under whom I was employed, during the two first years of my residence here, than in all my life besides. He attempted to practise both imposition and coercion upon those in his employ—under specious pretensions, but so shallow as to be easily detected. He tried his various schemes upon the men with such impudence as to lose the confidence of them all; and the concern had to pay much more for his meanness and tampering with the tempers of the men, than they would have done had his conduct been liberal. But he was a mere merchant, and not fit for such an undertaking—which was indeed a difficult one. In fact, he was a man of no talent, except for a close bargain.

Two men died the first winter, and I was sick several weeks with a nervous fever. The first foreman only stopped one year, and two other men were sent home soon afterwards. I managed, however, to get through with the government job, and then requested my discharge—offering to pay my own passage back, and to wait until the agent procured another man in my place: but no; I was too steady a man for that, and he would not let me go. I knew he could give me some trouble, as I had agreed for three years, as all the others had

done. They, however, quarrelled with him, and got away so. I would not descend to that, but wrote him a letter on the subject, which he thought proper not to answer; and this is what gave me offence. No doubt he was consoling himself with the idea that he could oblige me to fulfil, to the very letter, a contract, the spirit of which he never regarded; and it was suspected that he presumed too much upon his influence with the government, and the value of bribes to the petty officers: but be this as it may, he had reason to repent of his folly in the end.

I kept at work until the time I had stated I wished to leave, when I was advertised in the Gazette, according to the custom of the place: and, at the proper time, I applied at the district office for a certificate. I found a letter there from the agent, containing statements which were for the most part incorrect, but sufficient to prevent my getting a passport. My mind was then wound up to the sticking point. I employed an attorney, and petitioned the governor, Count Miloradowitch, who instituted an investigation; but things went on so tardily, that I petitioned him a second time, and obtained my passport, after thirteen weeks' delay. By that time, however, the winter was setting in, and it was a bad time to leave.

Just before this time, a new agent had been appointed. I engaged with him for the winter, recovered the wages for my lost time, amounting to nine hundred and thirty-six roubles, and brought away a good recommendation, signed in behalf of the proprietors, by the last agent.

The following incidents, which befell me during my residence in Russia, may be appropriately related here. I have had many small accidents, but not many very serious ones. By being careful, I have avoided many; and by acting adroitly when an accident has actually happened, the consequences have been less serious.

I once escaped unhurt by a sudden and curious motion of the body, when in great danger of serious injury. This was at the gas works. A quantity of oil was let into a red hot retort, by mistake. The retort was open, and I stood directly in front of it, and not more than three feet off. The oil was instantly set on fire, and a dense volume of flame rushed forth towards me, and passing upwards, would have struck me in the face, had I not leaned backwards so as nearly to fall, before I dared to move a foot. If I had moved my foot first, the consequences would no doubt have been dreadful.

On another occasion, at the same place, I had a severe trial, which kept me and many more in suspense for about an hour.

The gasometer was placed in a room adjoining the one where the retorts and furnaces were; and the partition wall became much heated, one day, by burning wood, as we were out of coal at the time. The tank which held the water for the gasometer was made of plank, and lined with lead. It was about ten feet deep, and placed within six inches of this party-wall. The heated part of the wall was about seven feet down the tank, the woodwork of which was set on fire by the hot wall. The fire was not discovered until dusk in the evening, when the men went into the gasometer room to put on the pressure, previous to lighting up. The room was then found to be filled with smoke; an alarm was immediately given, and great confusion prevailed for some time.

The general, who had charge of the building, on hearing of the accident, ordered the whole concern to be pulled down by the soldiers; and they went to work, without any judgment at all,—when our foreman, a spirited little fellow, and myself, exerted ourselves to the utmost, to stop the mad proceedings of the Russians, and to put out the fire. Our first

move was to shut down the dampers, and to draw all the fire from under the retorts; and then to proceed to the gasometer room, where we found the men breaking the sky-lights, and endeavoring to remove the roof of the building—and some of them were actually on the top of the gasometer. We ordered them off, and told the men to stop breaking the windows, &c. The smoke had now cleared away; and the water remaining at its usual height in the tank, we concluded that the lead lining was not yet melted.

At this time, a fat major came to the spot, quite out of breath, and called for me. He asked me, in Russ, if there was danger; when I assured him there was not, and that I only wanted half a dozen men, a crow-bar and a rope. Planks were nailed on the top of the tank, to cover up the opening; forming a platform just wide enough for a man to walk on, between the gasometer and the wall. Before we could know the extent of the fire, it was necessary to raise one of these planks, which was done by me with a crow-bar, to a distance sufficient to get a rope round the end of it; and then the soldiers could use their strength to some advantage. Water was thrown down, and we found the damage but trifling. The pressure of the gasometer was then regulated,

and the house lit up as usual, after an hour of bustle.

We then went home to supper; and I was amused with the accounts our gas fitter gave. It was his duty to light up the chandeliers, &c. He was running about all the time, trying to keep the lights burning; but the agitations of the gasometer, caused by the confusion, made the supply of gas very irregular, and the lights would frequently go out. As he did not know the extent of the danger, he was stopping every now and then to hear the gasometer blow up.

Our agent took good care to keep far enough off; and he kept the interpreter with him, so that we had to interpret for ourselves; but they were both frightened.

The flue of the furnace was afterwards turned another way, and all went on well.

CHAPTER VI.

THE ARTS IN RUSSIA.

Russian workmen. Public buildings. Carpenters. Masons. Useful contrivances. Carriages and horses. Academy of Arts. The Emperor's Hermitage. The Summer Palace.

My leisure time was spent, while residing at St. Petersburg, in studying the Russian language, drawing, and mechanical amusements, in winter time; and in summer, in visiting places of note, and observing the manners and customs of the inhabitants. I remained three years in the city, and could say much about the place and the people; but must confine myself chiefly to things concerning mechanics and the mechanic arts.

Generally speaking, the Russian workmen do very well. As there has been great encouragement given to strangers, many have settled among them, who have improved their manners. Their manufactories of iron, and of goods from flax and hemp, have long been celebrated. They have also carried the manu-

facture of paper, cotton, silk and glass to considerable perfection.

Granite is much used in their public works, for foundations of buildings, for lining the canals and rivers, and for side-walks. Some of the columns made of granite are very large, and highly polished. I took the pains to measure one of the columns intended for a new church, and found it fifty-six feet long, and six feet six inches in diameter at the base. They were brought from Finland: two of them were a load for a ship, one being placed on each side of the masts, that they might balance each other. They were rolled from the deck to the vicinity of the intended building, on timbers nine inches square, placed but little distance apart, which were completely crushed to splinters. The rolling was performed by two ropes; one end of each being made fast, some distance ahead, to stakes driven into the ground. They were passed under the column, up the back side, and over the top. The other end of each rope was wound upon a separate capstan. Each capstan had four long levers, with from ten to twenty men at each lever. These columns were placed in a temporary building for polishing.

I visited the foundry where the bases and capitals were made. They were of brass,

highly polished and gilt; and of the Corinthian order. The square plinth for the bottom was about nine feet on each side, and one foot thick. Several women and children were polishing these with pumice-stone. The torus, a round head belonging to the base, was turning in a lathe. The man had a very strong tool for this purpose. A steam-engine, with a man to attend it, was employed entirely on the work. The capitals, with their leaves and volutes, had a splendid appearance.

It is astonishing to see the variety of work a Russian carpenter will do with his axe only. It answers for the saw, hammer, rabbit plane, shave, and in some cases, for the chisel. At his meals, he cuts his black bread with it. The fore plane which they use has four handles; and it takes two men to work with it. They sit on a pile of boards, planing that which is uppermost; one man pushing, while the other is pulling the plane. The joiner uses a saw in a frame, somewhat like those used by the wood-sawyers in Boston.

The masons build their walls very thick. Their stages are ascended by inclined planes, instead of ladders, so broad that one might drive a carriage up them with ease. The mortar is carried by two men on a kind of hand-barrow. They walk up these gentle

slopes very leisurely. The bricks are carried by one man. He takes a piece of board two feet long, with four projecting pins or arms, two of which rest on his shoulders, while the board hangs down his back; the other two pins being for the bricks to rest upon. In this way, he carries about sixteen bricks at a time.

Lord Bacon observes, that when we travel into foreign countries, we should not adopt every new thing we see, but now and then prick in a flower. Following his advice, I will here describe three things which appear to be useful, and peculiar to this place. At least, I have not seen them anywhere else.

Fig. 1. Fig. 2. Fig. 3.

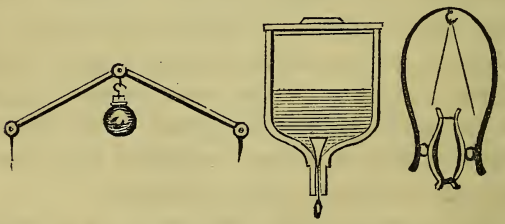


Fig. 1 represents a contrivance for shutting doors. The power is applied in the same way as in our modern iron printing presses. There is a pin at each end of the apparatus. One pin is fitted to and turns in a socket attached to the

frame, and the other is fitted to a similar one in the door. In opening the door, the pins are brought nearer together, and the weight in the centre is raised. The door is shut by this weight straightening the bars, and spreading the pins farther apart. Some of these articles are made of iron, and are black; others are of brass, and kept bright. They are extensively used.

Fig. 2 is a cistern for water, with a valve in the bottom, which is much used for washing the face and hands. By raising the valve, the water is let down in small quantities, and as it is used, passes off by means of a sink placed underneath. The advantages of this method are, that persons do not wash in the same water with others, nor use it more than once themselves; which is not only more conducive to health, but makes less water necessary than washing in a common bowl. These cisterns are made of various forms and sizes. Some of them have a dozen or more pipes, each furnished with a valve, so that many persons may wash at the same time. The large ones are made in a circular form, and placed in the middle of the room; but the small ones are hung against the wall.

In Fig. 3 is represented a spring bow, or arch. This is used with the horse-collar, for

the horse that is placed in the shafts. Other horses do not wear them. It was a long time before I could see any other use for this contrivance, than to cause the horse to hold up his head, and to keep him from stumbling, by the bridle being hooked to the top of the arch. I was informed afterwards, by an intelligent man, that the spring being connected with the collar, prevented the shoulders of the animal from chafing, by continually easing the collar off, and suffering the air to pass between that and the shoulder of the horse.

The drosky is the most common kind of carriage used here, (like the hackney coaches in London.) It is used with only one horse, and there is only room for two to ride, besides the driver. The drivers have tickets about their necks, numbered and dated. There are likewise a great number of droskies belonging to private persons. Some of them are very expensive; and they generally have two horses abreast. One of them, however, seems more for ornament than for use—being obliged to carry his head so far from his companion in the shafts, that he appears to be in misery, and is obliged to go nearly sideways.

Small Arabian horses are those most generally used; and they are prohibited from being exported. Those in the meanest service are

in very good order, and full of spirit—springing forward at the voice of the driver, who carries neither whip nor stick.

A better kind of carriage, called a kallashka, is drawn by four horses, in imitation of English carriages. It is used by the gentry for long journeys, and is sometimes driven about town. Very often they have four horses abreast behind, and two before; and sometimes more than that. I have seen eight horses abreast attached to one of the Emperor's carriages, in imitation of the ancient Roman chariot.

The Academy of Arts is open to the public once in three years. I had the pleasure of spending several hours in examining some of the specimens of painting, sculpture, &c., in the rooms and corridors; but they were so numerous as to require months, instead of hours, to examine them properly. The corridors alone are said to extend more than a mile in length. Although this building is devoted chiefly to the fine arts, there are many specimens of mechanical skill. I noticed a model of the machine on which a large block of granite, weighing upwards of nine hundred tons, was removed several miles. Peter the Great is said to have stood on this rock, giving commands to his army, when he subdued the Fins. The Empress Catharine ordered it to

be removed to the city, for a foundation, on which is placed a statue of that monarch on horseback. Many ineffectual attempts were made at its removal; but it was easily performed afterwards, by introducing cannon balls for rollers between bars of iron.

The most splendid specimens of art that I remember to have seen, were in the Emperor's Hermitage, which is attached to the Imperial Palace, forming a place of retreat from the busy scenes of the court. In this building are many splendid rooms, the walls of which are hung with the most costly paintings, by the first artists of every country, that could be procured by money or otherwise. There are also several delicate specimens of sculpture, and models of architecture, with a variety of curious articles made of gold, silver and ivory: in fact, nearly every variety of material is here found fashioned into something either useful or amusing.

The splendid jewels belonging to the Emperor are also kept here, and a great variety of gold and silver coins and medals. Some of these are very ancient. There is also a cabinet of minerals, and a collection of rare books. One work appeared to consist of about eighty thick folio volumes, and to be placed there more for show than anything else.

These rooms form a square; and in the interior is the winter garden, kept warm and comfortable. There, let it be ever so cold and dreary without, are to be found thriving plants and singing birds. Directly over this is the summer garden, on the top of the building. To complete the variety, there is a small theatre, with seats in a circular form, which I thought would be a good model for a lecture room.

Among the specimens of the mechanic arts, were two large vessels, seven feet in diameter—one of richly cut glass, very massive, and the other of jasper, and about the same size and pattern. They were wrought in the country, and presented to the Emperor, as rare specimens of skill.

There are other palaces in St. Petersburg, and several in the country, within thirty miles of the city. Some of them have very fine gardens, laid out with great taste—the walks of which are very pleasant, for nature and art have been taxed to the utmost, to make them so. Many marble statues are placed in the gardens, appearing to have been brought from the ruins of ancient cities. They are also frequently enlivened by bands of music.

The Summer Palace at Tsascocela was the most popular, having been the favorite retreat

of Alexander. In the gardens belonging to it are many curiosities, among which is a complete Chinese village, with cottages, bridges and temples: but the thing that pleased me best was a spring of water, with its embellishments. It is situated in a valley, well shaded with tall trees. The approach to it is rather gloomy; but when you reach the spot, an open space appears. The spring is on one side, and on the opposite side are seats placed in a semicircular form, where you may rest yourself. The water issues from a broken pitcher, which appears to have just fallen from a young lady's hand—which, with the whole embellishment, is a remarkably delicate piece of work in bronze. It consists of a pedestal, on which is a beautiful female reclining, supporting herself by the left arm. In her right hand is the handle of the pitcher. The pitcher itself lies on the pedestal, and overhangs the front edge enough to prevent the stream of water from touching its base. Her eyes are fixed on the pitcher; and she appears to look so earnest and so composed, that if she could speak, I should expect her to say coolly—"It is done, and cannot be helped."

CHAPTER VII.

FIRST ADVENTURES IN AMERICA.

Employment during the passage to America. Excursions in the country. First impressions. Anecdote. Residence at Methuen. Reading society. Amusements, &c.

In June, 1823, I left Russia for the United States; and after a voyage of sixty-three days, was safely landed on India wharf, in Boston, Mass.

I amused myself during the passage, at such times as my health would permit, in the study of mathematics. I had previously made myself acquainted with the improved engineers' sliding rule, and decimal fractions; and committed to memory several useful factors, such as 3.1416, .7854, 27.648, &c. These and many others are often used to find the superficial and solid contents, and also the weight of different bodies. After getting used to the motion of the ship, I commenced making a table, by which I might easily calculate the pressure of a column of water of any diameter, and of any

height. Before it was finished, however, I perceived several repetitions; for the very same figures occurred in different answers; and on examining a little farther, I found out the rule by which they were governed—namely, the shifting of the decimal point—which enabled me to simplify my work very much. I found that the answers to the first nine numbers would serve for all the others, whether above or below unity.

I was highly delighted with this discovery. As it happened when I had several weeks of leisure, and but little to engage my attention, I pursued the subject with ardor; and before I left the ship, I had prepared several tables for various purposes. The passage seemed too short for me. How tedious a voyage of several weeks must be, to persons who have no resources of amusement within themselves! whereas persons of studious habits may, with a few books, pens and paper, beguile those hours which to others would be almost insufferable. The same may be said of persons confined in a prison, or by sickness.

Having got on shore, and safely disposed of my baggage, I purchased a few books and maps for my immediate use, and set out on an excursion into the country, in company with a friend. We crossed the Bay to Cohasset,

and after climbing the slippery rocks, we passed through some woodland to the village. My friend amused himself with his gun for three or four days, while I was looking about the place; for everything seemed rather strange and interesting. In the mechanical way, I saw several simple contrivances, which answered very well the purposes for which they were intended. Among them were cheese and cider presses, and small windmills with pumps, to raise the sea water for making salt. Nature also presented many interesting objects, some of which were new to me. The mighty ocean with its rocky shores, and the sea-breeze on a sultry day; the wild woods, with the chirping and croaking of their inhabitants; Indian corn; the black snake, the skunk and the squirrel; several kinds of birds and water-fowl;—these were among the objects that attracted my attention.

We went also to Marshfield; but the scenery there was less interesting. The stone walls, however, which are everywhere to be met with, struck me as very curious. The old lady of the farm house, where we stopped, was very communicative. She politely showed me the orchard, which was extensive, with the trees well laden with choice fruit. She was

pleased with my account of other countries; and, in return, I was instructed in the mysteries of making fire cakes, dough-nuts, &c.; and also in peeling apples by machinery. The apple was stuck upon a fork, and caused to revolve by a crank, while a knife something like a spoke shave was held against the apple. The process is very simple, and expeditious. The apples were next quartered, and dried for future use. I was informed by this lady that she stood at her front door, and saw the engagement between the Shannon and Chesapeake.

After returning to Boston from my excursion, I began to think about employment. A small farm and a mechanic's shop united, were what I had thought of; and with this view, I went about forty miles to look at a shop and some land that were for sale; but after examining two or three lots that were offered, I concluded it would be best to wait a few years, and get more acquainted with the manner of trading, which I found required some experience. I was led to this conclusion from a transaction that I saw. The man who had the lots of land to sell, called on a tanner and looked out a calf-skin; and after a long talk, agreed to pay so much Indian corn for it. He

told me it would make two pair of boots; and that the boot-maker was to have one half the skin to pay for working up the other half.

I was soon engaged to work in a machine shop, connected with a cotton factory situated at Methuen, Essex County, Mass., something less than thirty miles from Boston. Here I remained three years, commencing in the middle of September, 1823.

Six months passed away, without my being able to do anything towards my favorite object—the promotion of popular improvement. In the spring of 1824, however, an opportunity offered itself for me to attempt the formation of a society for mutual improvement. A discourse was delivered on the afternoon of fast day, by the clergyman of the village, on the importance of knowledge, and the facility with which it can be obtained, by a judicious arrangement of our time, and by associating together for mutual benefit. In fact, he expressed my views so well, that I felt confident of a kind reception from him; and I accordingly waited on him the same afternoon.

After stating my views, and presenting him some papers on the subject, he informed me that a small society for reading had existed for about five years in the village, but was at a very low ebb at that time. He was pleased

with my proposals, and invited me to attend the next meeting of the society.

I attended, and found a respectable number of both sexes assembled at the house of one of the members. They were engaged in reading by turns from Whelpley's Compend of General History; and the president put questions to them, as they proceeded, which made it interesting. At the close of this exercise, he asked me how I liked it. "Very well," was my reply. I then inquired what other exercise they had. He told me that was all, except an annual address, which he delivered himself. I asked him if it would not be well to try the debating of questions, and familiar lectures on science and the arts. He said he thought well of it, but they felt very cautious how they ventured from shore, lest they should get into deep water. I told him I thought they need not be afraid; for I had seen persons engaged in such exercises, whose opportunities for intellectual improvement were inferior to theirs. I was asked if I could give them a lecture. I said I would try; and prepared myself accordingly.

I had brought a small air-pump with me from Russia, which I made of a piece of gas-tubing, with a ground brass plate, on a mahogany stand. I bought a few glass articles,

which I ground to fit the pump-plate, with a little sand and water, on the hearth-stone of my room. I procured a small wash tub, and fitted a shelf to it, for a pneumatic cistern. In this way I succeeded, with a very simple apparatus, in explaining the mechanical, and some of the chemical properties of air.

This put new life into the society. Their Constitution was revised, to make provision for a library and apparatus. Debating was also introduced with success; and the ladies handed in compositions, which were read at the meetings. The reading exercise was pursued only occasionally. Several of the members were prevailed upon to give lectures on subjects connected with their professions, unless some particular branch of knowledge had been studied by them. It required considerable effort on the part of the more active members, to bring those forward who were very diffident. More than one case occurred, however, in which gratitude was felt by those who had thus been roused to action.

I served as vice president of the society during the remainder of my stay in the town, and took an active part in its exercises.

The society continued to meet at the members' houses, until it became too large to be thus accommodated. They then tried the

school house, and the hall at the tavern; but not being satisfied with either of these, they built a two story building for their own accommodation, at an expense of twelve hundred dollars, of which I furnished my full share. The building was completed within two years from the time I was introduced to the society. The hall was let to another society; and there were two mechanics' shops under it.

Since this time, the society has been quite prosperous. The exercises were weekly, in the following order:—1. Reading by all the members; 2. Reading by one member selected for the purpose; 3. An original lecture; 4. Discussion. This monthly course was continued for one year after the new hall was completed.

In October, 1826, I left this place to reside in Boston, and have not visited it since; but I have frequently heard of the prosperity of the society.

I amused myself at times, while residing in the country, with making additions to the decimal tables, which were commenced during my voyage to the United States. About one hundred and fifty of them were made, from which forty-eight were selected and published, with directions for their use, and examples, at Boston, in 1830, after ascertaining their value,

by previously printing a few specimens, and distributing them among my friends. For this purpose, as there was no printer in Methuen, I procured some types, and made a press, and all other articles necessary for a miniature printing and binding establishment; and produced, with the labor of my own hands, over one hundred small pamphlets of fourteen pages, containing sixteen of these tables, with examples, &c. This was in 1825. I also performed sundry small jobs in the printing line for my friends; which were of some service to them, and quite a joke to me.

While residing in Methuen, I acted as superintendent of a Sabbath school belonging to the Baptist society of that place; and yet I call myself a churchman; though I have never made any particular professions of religion. I also, while in this town, became a Mason, and was installed into the office of Senior Warden of Grecian Lodge, by a deputation from the Grand Lodge of Massachusetts, on the 10th of May, 5826; and soon after, I had to officiate as Master, during the remainder of my stay in the place, owing to the Master's leaving the town. Afterwards, in Boston, I took the higher degrees, as far as the Royal Arch; but my business and other engagements prevented me from paying much attention to

the subject. Still, I know enough about the institution to declare it not only innocent, but of a moral and useful tendency, when its rules are followed. And I can say with truth, that I have never spent happier moments than while in the lodge, where all meet on the same level.

CHAPTER VIII.

RESIDENCE AND OCCUPATION IN BOSTON.

How employed. Making of school and philosophical Apparatus. Causes of success. Loss of shop and materials by fire. Good fortune comes at last.

The next ten years of my life, which were spent in Boston, may be divided as follows:—One year and three quarters as a journeyman, in the service of Mr. William Philpot, machinist; the next three years as co-partner with Mr. John Codman, machinist; then three years and a quarter in business by myself, and for the most part engaged in making and selling apparatus for illustrating the various sciences, (though a beginning had been made in the making of instruments, particularly air-pumps, before I left Mr. Codman;) and the remainder of the time in connection with Mr. J. M. Wightman, who now has the care of the business.

It has been seen, that from a boy I have had some tools of my own, and have been engaged

in my leisure time in making various articles for experiments; and that I have also been very fond of engaging in any measures for popular improvement.

After I had been in Boston three or four years, Mr. Josiah Holbrook, a gentleman much engaged in the establishment of Lyceums, came to me to see about apparatus, as he was trying to introduce such cheap and simple instruments into schools and other seminaries of learning, as would come within their means. He had already several articles for illustrating geometry, astronomy, &c.; but air-pumps were not then simplified enough to form a part of the Lyceum apparatus. At this interview, I introduced to his notice a small air-pump for exhausting and condensing, and several articles of apparatus to be used with it, which I had made for the amusement of myself and my friends. He frankly acknowledged it to be the very thing that was wanted in the smaller establishments for education. He wished me to make some for sale, and promised to recommend them, which he did not fail to do. From this interview, I may date the commencement of my making philosophical instruments, as a regular business. And upon the whole, I have been more successful than could be expected, when it is considered

that it was a business so different from the one I had been used to.

And how is this to be accounted for? From a variety of circumstances, among which may be named, a demand for cheap and useful instruments, and the fact that I was connected with several societies for improvement, and the frequent demand on me for lectures, affording me many opportunities of showing how much could be done with my simple apparatus, which was also lent out to be used by others; and in this way, most of the teachers and others having charge of the various institutions for education, became acquainted with me and my pursuits. Then, again, the place where I was located was very favorable. Boston is styled the "Literary Emporium." Education is more generally diffused throughout New England than the other parts of the Union, and teachers from this part are much in demand in the other sections of the country.

Such I conceive to be some of the reasons for my success; and the fact of my mind not having been biased, while young, to the regular routine of instrument makers, turned out to be a favorable circumstance. I had the theory, or principles of several sciences, and an extensive acquaintance with machinery, with something of an inventive mind; and had imbibed

very strongly the idea that if a machine performed well, its construction could not be too simple.

I managed finally, with such assistance as I could procure, to contrive and introduce a number of useful articles of apparatus, suitable for illustrations in some of the sciences; but a greater innovation was made in regard to the air-pump than anything else. Three different sizes were made, all of them upon new plans, forming a complete system of air-pumps, adapted to the several grades of institutions for the purpose of education.

As I commenced business without capital, I had to struggle a long time in straitened circumstances, and was obliged to be very industrious and prudent. And after getting the business into a good train, with a prospect of making it profitable, the whole concern was brought to a stand very suddenly, by the burning of the building which I occupied, particularly the upper part, where my shop, ware-room, &c., were situated.

This occurred in the summer of 1835. The fire caught in the cellar, while the workmen belonging to the lower part were gone to dinner; and such was the combustible nature of the materials, that the flames rushed up the

stairway leading to my shop, so suddenly that myself and one young man were obliged to make our escape through a scuttle in the roof, while another, who barely saved himself by the stairway and a second story window, was so badly burned that he scarcely avoided losing his life, after upwards of two years of suffering. He had gone down the upper flight of stairs in great haste, and having passed the door, which shut with a spring, he could not return; but, with astonishing fortitude, leaped out at a window of the second story, although the flames were passing out with fearful violence at the same time.

The other lad had followed him until, on opening the door, the flames came full in his face—which, with one of his arms, was much scorched; but the door closing, he returned, and told me that Henry could not be saved. We then, after looking round for a moment, made our way out through the sky-light, just as we were, with our paper caps and aprons on, and our shirt sleeves turned up, leaving our hats, coats, &c., to the mercy of the fiery element.

By the time I reached the street, so many people were collected in front of the building, and there was so much confusion, that I could get no information of the other lad, for nearly

two hours. I finally learned that he had escaped, and was taken to a physician, who had dressed his wounds, and conveyed him to his mother's house, at the south end of the city.

My principal workman, Mr. Wightman, was at this time confined to his bed with a typhus fever, which was increased by this calamity—particularly as the young sufferer was his brother, who, when taken home, reported that he was the only one of the three who had escaped; and I actually had to show myself at ten o'clock the same night, to convince him that I was still in the land of the living.

All my help, consisting of three persons, were now confined to their beds; the stock of apparatus and my little library destroyed, and the tools so much injured that it took me two months to get under way again. The young man least injured got well in three weeks; and Mr. Wightman recovered in five or six weeks, when he accepted my offer to become a co-partner in the concern. By his industry and economy, he had saved a considerable sum; and his skill as a workman, his general good character, and his remarkable fidelity to me, rendered this only an act of justice due to him, when so favorable an opportunity offered itself. Mr. Wightman had worked with me

without much interruption, ever since I commenced making apparatus, and has assisted me in many of my inventions;—in fact, he has been all along my right hand man.

My insurance was promptly paid, which enabled me to satisfy my creditors, and to furnish my part towards starting again. I bore this reverse with all the philosophy I was master of; and Dame Fortune now seemed determined to try me on another tack. In less than a year from the occurrence of the above described disaster, I was put in possession of a handsome property, which enabled me to put the business upon a more respectable footing than it had ever been before; and afforded me an opportunity of revisiting my native country, for which I proceeded to make preparations.

Thus much in regard to business. The greater part of my leisure time has been devoted to the acquisition of useful knowledge, and in efforts to bring others into similar pursuits. Of my endeavors towards the promotion of societies for improvement in useful knowledge, in this city, some account remains to be given, in another chapter. It may be added, also, that I occasionally contributed various

articles, on subjects of a practical character, to the mechanics' magazines, especially the Young Mechanic, of which there will be found occasion for further mention hereafter.

CHAPTER IX.

INVENTIONS.

Small Air-pump. Experiments performed with it. How invented. Large Air-pump. Medium sized Air-pump. Bottle-proving machine.

The following is a more particular account of the principal of my inventions and improvements in school and philosophical apparatus, &c., mentioned in the preceding chapter, especially the air-pump.

The small air-pump was first introduced, and formed part of a set of pneumatic apparatus, capable of performing more than twenty experiments, illustrative of all the mechanical properties of the air, as the pump was both an exhauster and a condenser. Some of the experiments were rather striking, particularly that of raising a fifty-six pound weight, by the upward pressure of the atmosphere. There was also a water-pump with a glass barrel, and a syphon. The whole were packed in a neat case, which might be carried under the arm.

A lithographic print, showing how the various articles were to be used, was pasted under the cover of each case; and an explanatory pamphlet was also sent with each set of apparatus.

[Experiments with the small Air-pump.]

The construction of this small air-pump was very simple, yet it was quite effective; and although its action could easily be reversed, there were no spare parts, they being all used in each operation. It consisted of a single barrel of small bore, and therefore easily worked by the hand, applied to a handle on the end of the piston rod. There was a screw for attaching it to several parts of the apparatus, and also a ground plate on the end of the barrel; and this plate, which was cast on the pump, con-

stituted its chief novelty. This contrivance was discovered in the following manner:

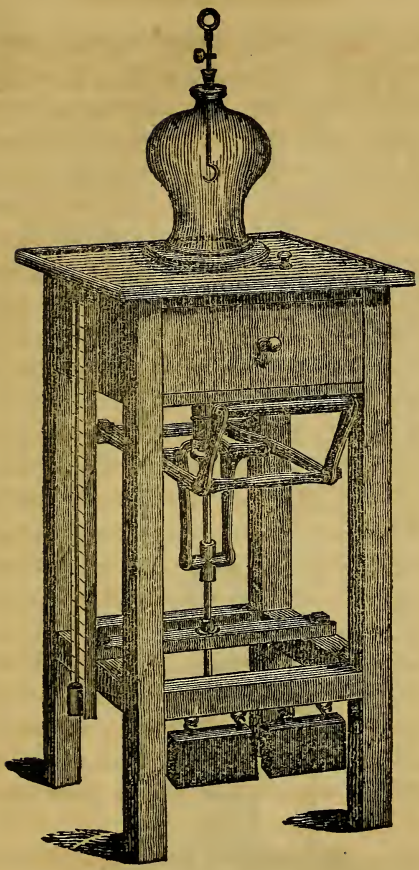
As I was giving a lecture with a small single barreled pump, with a ground plate on a mahogany stand, and the barrel attached to the stand at the back of the plate, I attempted to perform the experiment of making a balloon rise in water; but on covering the jar containing the balloon with a receiver, I found the latter was cracked, and very leaky. After a short trial, the thought struck me that the experiment might be performed without the receiver, as the jar was ground on the top. So I unscrewed the plate from the stand, and placed it on the jar; and the barrel being also removed from the stand, was attached to the plate itself—thus forming as complete a pump as before, but much more simple. And from this hint sprang all the small air-pumps which I have made, as well as those which others have taken the liberty of making after my plans.

The sale of this article has been much more extensive than could have been anticipated. On my observing to a friend that I had a prospect of making something of it, he said that a dozen would go a great way towards supplying the demand; but instead of dozens, there have been several hundreds of complete sets sent to various parts of the United States, and some

to other parts of the world. In fact, this has been the most important article in the business, whether as regards my own benefit, or the extensive place it occupies among the means of education. My larger pumps, although they are simpler in construction, cheaper, and easier to use than many others, only take the place of the more expensive ones before in use; whereas this article has been introduced into many small institutions, where it would have been quite impossible to introduce others, on account of their great expense.

The large air-pump was invented soon after the completion of the small one. In fact, the first large pump was suggested by inventing the small one, and was made very nearly in the same shape, but much larger. It consisted of a stout mahogany stand, with a square top, like a table, resting on the floor; but several inches higher than a common table. The plate of the pump rested on the top of this stand, and the barrel projected through the top. The piston rod, which extended down below the barrel, was worked by a simple lever; and the operation was very easy.

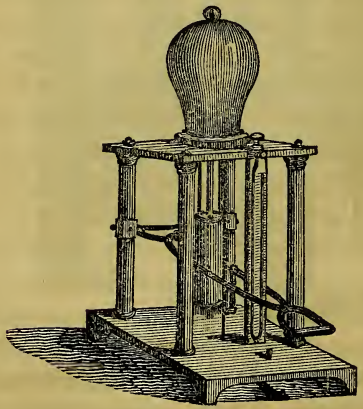
This pump was modified several times during five or six years, until a medium sized pump was invented, to stand on a table, and consequently, of a more portable character.



[Large Air-pump.]

This contrivance was a great desideratum, for some years before it was accomplished. But in 1834, the medium sized pump was com-

pleted, and a patent obtained for it; and immediately after, the large pump was improved by means suggested while finishing the portable one. These pumps are worked by a simple lever; and the barrel moves, while the piston is stationary. Both valves are attached to the piston. The barrel is completely closed at the bottom, and the exhaustion is performed by the downward action of the lever, pressing the pump down upon the table or floor on which it stands, while the upward motion is greatly assisted by the pressure of the atmosphere. Thus the difficulty so long felt, of fastening large pumps down, and of keeping them steady while in action, is completely overcome.



[Medium sized Air-pump.]

Passing over a number of minor articles, which, though useful, it might be tedious to describe here, I will conclude my remarks on this part of the subject by giving an account of an invention of mine of quite a different character.—About seven or eight years ago, I was applied to by the agent of the New England Glass Bottle Company, about a machine to try the strength of porter and other bottles. He had seen a notice in a scientific periodical, of a machine invented in France for this purpose, but without any description; and he had no idea how it should be made. I told him that I had as much as I could do in attending to my own inventions; but I would think the subject over, and if I did not make the machine, I was willing to give the person who might make it the results of my thoughts on the subject. I matured a plan, and after considerable solicitation, made the machine myself, which had the effect of helping the company out of their difficulty; for upon trial it was clearly proved that their bottles were stronger than the imported ones, being all put to the same test.

This machine was made upon the same principles as the hydrostatic press; and although the piston of the forcing pump was only half an inch in diameter, yet the operation

was performed in a short time; for the bottles were filled with water previously to attaching them to the machine, so that it required but a few strokes of the pump to put on the pressure; and the power required was so small that a light force applied to the end of the lever was sufficient to give a pressure of several hundred pounds on the square inch, which pressure was indicated by the rise of mercury in a tube closed at the top, and previously filled with air. A graduated scale was attached to the tube, to show the degree of pressure at any period of the operation.—What made this machine of so much consequence to the company was, that the consumers of bottles would not purchase them, unless they were warranted to be as strong as the imported ones; and this the company had previously no means of ascertaining.

This machine was subsequently put in order and used by the Assistant Quarter Master, at Boston, to try the strength of articles made of India rubber cloth.

CHAPTER X.

SOCIETIES IN BOSTON.

Boston Mechanics' Institution. Its history. Classes. Charitable Mechanics' Association. Boston Lyceum. Mechanics' Lyceum. The Essayist. The Young Mechanic. Franklin Lectures.

On my arrival in Boston, my first object was to make inquiries respecting mechanics' societies; but I was surprised to learn that no society existed to which a mechanic could resort, and hear lectures on subjects calculated to aid him in his vocation. There had been some talk of building a mechanics' hall, &c.; but that project was abandoned. I conversed with several persons on the subject, who were willing to assist in forming a society for mutual improvement. I put a notice in a newspaper, stating where names would be received, and finally called a meeting, which was attended by nine persons; and a second, which was attended by only seven. At this meeting, it was determined to make the thing more popular, by advertising it in the daily papers, and hiring

a hall in a central situation. The next meeting was held at Concert Hall, and was very well attended. The result was the formation of the Boston Mechanics' Institution. This was in 1826.

The society soon became popular, which induced others to follow the example thus set; so that it became evident that in Boston, as well as in other places, it only required a little exertion on the part of those who felt an interest in the subject, to induce at least a portion of its citizens to improve these advantages.

Finally, however, other societies of various kinds becoming numerous, the Institution became deprived of so large a share of its former patronage, that the receipts were found insufficient to defray the expenditures; and the lectures were discontinued, (with a hope, however, of reviving them at some future time.)

Being the first society in Boston, that introduced popular lectures on various branches of science, it would seem rather strange that it did not continue longer. The fact of the patronage being divided among a number of societies is not sufficient to account for its decline—it having made such an auspicious beginning, with a large number of members, and in addition to the regular assessments, a voluntary subscription having been set on foot

soon after its organization, by which the liberal sum of about twelve hundred dollars was realized, and a collection of apparatus commenced. An act of incorporation was also obtained, and it had the appearance of a permanent institution; but the sequel shows that it was not conducted in a way to make it lasting.

As I have taken part in the management of this society from its formation, and have been very anxious for its success, I have, as a matter of course, formed my own ideas as to the causes of its decline. Not the least of these, I should say, was its unsocial character. A course of lectures, merely, during the winter, was all that the managers ever attempted: no library, reading room nor classes. A class on mechanical science was indeed formed, by members of the Institution, with the expectation that the managers would give it encouragement, and own it as a branch of the Institution; but they merely appointed a committee to consider the subject, with power to furnish a room for the class. They decided, however, that it was inexpedient; and some of the board thought it wrong to take the funds of the society for the purpose. The class might have supported itself, if persons could have been admitted who were not members of the Institution; but the rules of the class forbade it.

In fact, the class adhered too closely to the rules of the parent for its own benefit; and was finally discontinued, for want of a little of that fostering care which the managers might have bestowed, with advantage to the parent institution, as well as to the class.

I took a very active part in this class, and had reason to expect that other classes would be formed on various subjects, which, while they enabled the members to make the most of the information received at the public lectures, by a more particular application, would have formed with the parent a bond of union not easily broken, and rendered some of the smaller societies since formed, unnecessary.

The plan of classes, in connection with a large institution, is better, in some respects, than so many small, independent societies, which are generally of short duration, as the removal of one or two active members is often sufficient to discourage the others, and sometimes to break up the society. The classes, on the other hand, can be filled up from time to time, as long as they take an interest in the subject; and when that fails, other classes may be formed, on subjects in which an interest is taken. By the concentration of talent and energy, with the various facilities afforded by a popular institution, the classes can be

conducted with more economy, and greater benefit, than can in general be secured by the smaller societies for mutual improvement. Still, I would not depreciate the latter, which will do much good, wherever they are carried on with the proper spirit; and there are many places where no other kind will succeed.

In my remarks on the management of the Institution, I disclaim the intention of imputing blame to any one. The gravest charge I am inclined to make, is that of error of judgment, in relation to the capacities of many persons among our youth and the humbler classes, for social and rational enjoyment, as well as for self-improvement, which are found to exist, and to be easily developed, under suitable influences; and which are proved to be much more general than the inexperienced in these matters could have imagined.

So tenacious are mankind, in their adherence to ancient prejudices, that among the better informed, a small portion of aristocratic feeling is sufficient to close their eyes, so that they can neither see nor appreciate those favorable symptoms which are constantly developed. All my experience is in favor of these opinions, which are confirmed still more by what I have lately seen of the London Mechanics' Institution, and others of similar tendency.

In justice to the managers of the Boston Mechanics' Institution, I must acknowledge they were placed in a peculiar situation, requiring more tact, and a greater variety of auxiliary means, than the leading members were disposed to employ.

Among the many kindred societies that had adopted measures similar to those of this institution, may be named, as its greatest rival, the Massachusetts Charitable Mechanic Association. This was an old and powerful society, with plenty of funds; but the members were very careful how these funds were spent. For a long time, individual members had been trying to introduce something of an improving nature into the society; but when lectures were named, there were always a host against any such thing. The following has been related to me, as a specimen of the kind of opposition the liberal members had to contend with:

A proposition was made for a course of lectures on chemistry; on which a sensible member exclaimed—"What good will chemistry do us? If we want medicine, the cheapest way is to get it at an apothecary's shop." And strange to say—such remarks, the offspring of very contracted views, had more

weight with the majority, than anything that could be urged in favor of the proposed measure.

The Association remained in this state when the Mechanics' Institution was formed; but the popularity of the latter soon brought the members of the former to their senses, and they actually voted one hundred dollars to a gentleman for a course of twelve lectures, which were delivered simultaneously with the second course given by the Institution. From that time, the Association has been progressing steadily; and there is some reason to hope that it will do much good in the end; for I have recently been informed that they are going on bravely in the work of improvement. "*Mirabile dictu!*" says my American correspondent, in 1837, "what can you guess has happened—a new comet discovered, caught and analyzed, or one of the men in the moon fallen off and alighted among us, to prove the moon story of last summer a hoax? No; not quite equal to that, but quite as improbable. The Mechanic Charitable Association have actually appropriated five thousand dollars Boston currency to get up a Fair, like the New Yorkers and Philadelphians, next October. This is the consequence of a drubbing given them by their

orator, Mr. Homer, at their last triennial celebration. *Vive la grande Association!*" *

The Mechanics' Institution commenced on a liberal plan, paying twenty-five dollars for each of their lectures, which were so well attended that a repetition of them was practised for some time, when forty dollars were paid for each lecture delivered twice. By such a course, the managers were enabled to procure several good lectures from regular professors, and to afford encouragement to other gentlemen of talent to prepare themselves. In this way, lectures were supplied for several years; and it is to be regretted that they could be no longer kept up. But it is some consolation to those who were the means of setting this intellectual and moral machinery in motion, in the capital of New England, to remember that it was effected by the Boston Mechanics' Institution, in the winter of 1826–7.

In the summer of 1829, I took part in the formation of the Boston Lyceum. I was elected one of its curators, gave several lectures during the two first seasons, and assisted in conducting some of the classes. After that time, my

* Mr. Claxton has probably learned, since writing the above, that the results of the efforts here alluded to have been as creditable to the society as could have been anticipated.

attention to the society was relaxed, in some degree, by the formation of the Boston Mechanics' Lyceum, and my appointment as its president, which office I held from February, 1831, until the termination of the fifth course of exercises, in 1835. These exercises consisted of lectures, debates, declamations, and occasionally, extemporaneous speaking—that is, speaking on a subject as soon as it is proposed. They were conducted on the mutual instruction principle, by the members alone, who were enabled to pursue this plan to advantage, after being well drilled to it in small classes.

This society has been often referred to, as a specimen of what mechanics and others might do for themselves, by suitable efforts. It has furnished speakers for other societies, engaged in various pursuits; and I might refer to one of the members, who used frequently to speak at temperance and other meetings, with good effect. One evening, I heard it remarked of him that he learned to speak at the Mechanics' Lyceum, which made me feel gratified, especially as this member had expressed a doubt of the success of the Lyceum, at its formation. I had been speaking encouragingly to the members, when he remarked, "That is all very well, if we can make it go." I devoted some

of my best efforts to this society; and we *did* make it go—better, in fact, than many had anticipated.

The members had the privilege of introducing ladies to the exercises, who were permitted to hand in pieces of composition, which were read at the meetings. Some of these were published in the "Essayist," a periodical conducted by Mr. G. W. Light, who was then secretary of the society. He was a printer and publisher, (in a small way at that time;) and had a literary taste and a devotion to the cause of popular improvement, which engrossed much of his time. The Essayist was devoted to literature; and the matter was composed chiefly of original pieces from young men.

An idea was formed from this, that a similar work devoted to the interests of young mechanics might be a useful thing. Thus the "Young Mechanic" originated, which was published for four years, viz., from 1832 to 1835, inclusive. It was got up, and conducted for some time, by six members of the Mechanics' Lyceum, including Mr. Light and myself. And here I may be allowed to remark, that Mr. Light has been of considerable service to me, personally, by his valuable instructions in

the art of composition, in which I must confess myself to have been rather careless.

In the above-mentioned work, articles were admitted from all who were disposed to contribute, however humble their pretensions—the conductors undertaking to prepare their articles for the press. Several memoirs of persons of merit, belonging to the humbler classes, were also introduced, by way of creating that degree of self-respect so necessary to command the respect of others.

In 1832, I was appointed one of the committee of the Franklin Lectures, got up for the benefit of those who were prevented from attending other courses, on account of their expense, and the early hour at which they commenced. These lectures, beginning an hour later, and being afforded at one fourth of the usual price, (which was accomplished by having most of the lectures gratuitous, and by the ready sale of the tickets, which, in some seasons, amounted to a thousand or more,) gave to the class they were intended to benefit a most valuable opportunity. The duty which I performed was merely that of assisting the committee in their deliberations, and giving an occasional lecture.

Boston is now well supplied with societies for the improvement of the mind. Some of

the larger ones, however, should be modified. So many different subjects are treated of in their lectures, in one season, that no person can get more than a smattering of knowledge on any one subject. Each society should take its own stand. Let one take a stand decidedly of a mechanical nature, another of a mercantile, &c.; and instead of one or two lectures on a subject, let there be a dozen given, if the nature of the subject requires it. We should thus get information that would be more substantial and thorough, and the interests of the various societies would not clash.

CHAPTER XI.

HOME REVISITED.

Anticipations. Visits to friends. London. Early impressions. Occupations. Formation of the Bungay Lyceum. "Hints to Mechanics." Engagement in manufacturing apparatus.

As I had not seen any of my relations for twenty years, any circumstance that would enable me to do so, without detriment to anybody, and with credit to myself, would naturally be hailed by me as very fortunate. My wife had for many years been hoping for an opportunity to return, and had frequently expressed such a desire; but as for me, I had hardly dared to hope. Although death had made some ravages in both our families, yet there were many left that were near and dear to us, besides a new generation that had sprung up during our absence, who were as anxious to see us as their parents were.

The long wished-for opportunity to gratify these desires was happily afforded by the sudden accession to our worldly fortune, which

has been already mentioned.—Leaving, therefore, my partner, Mr. Wightman, to manage the business, we took our departure from Boston, by the Providence Railroad, on the 3d of June, 1836, and arrived at New York the following morning. On the 10th, we sailed for London in the packet ship Gladiator; and after a rather rough passage, for the season, we arrived at Portsmouth, on the 3d of July, and went by mail to London, where we arrived next morning, in good health and spirits.

After remaining a week with my wife's relations, we made an excursion into the country to see my own. They were all very agreeably surprised to see us; for although we had kept up a correspondence, yet they did not know of our coming. One of my brothers, who has a large family, and who keeps a shop for the sale of various kinds of wearing apparel, sold us several articles, without discovering who we were.

After spending several weeks in the country, we returned to London, and took up our abode there for the present. I then made a number of rambles about town, and noticed many improvements made during my long absence. London is certainly a wonderful place; and yet, from the projects on foot for still greater improvements, it would seem to be still very

far from perfection. Its limits, too, seem to be unbounded; for additions are constantly making, in every direction.

I was rather surprised to find so many persons with whom I had been acquainted, both in town and in the country—some of them occupying the same situations they occupied from twenty to thirty years ago; and even longer than that, in two or three cases.

There is another thing which seemed strange to me: many things in the vicinity of my native place seemed very diminutive, especially the distances. What once appeared to me a noble river, was now a mere rivulet; and the bridges were reduced in the same proportion. I was also continually making blunders in regard to the distances of places in the town; and although I knew that all the compact part of it might be perambulated in half an hour, yet I could not easily divest myself of early impressions.

Such streets as Oxford Street in London, Broadway in New York, or Washington Street in Boston, are rather astounding to a countryman, at first sight; but they soon become familiar to him; and those in the smaller towns, on the other hand, seem to dwindle in proportion, as his sight is accustomed to larger objects. So the noise and activity of large cities

seems oppressive to most persons, for a while; but this is generally soon overcome, and it acts as a sort of stimulus to them, so that they can seldom endure the quiet of a country life afterwards, except for short periods. This shows that habit or custom governs our taste, and is apt to bias our judgment, if we are not very careful.

Soon after taking up my residence in London, I procured some tools with which to amuse myself; and by making some pieces of apparatus, and purchasing others, it was not long before I had the means of lecturing on several subjects at my command. Since then, I have, therefore, been endeavoring to make myself useful by giving lectures at the various institutions in and about London, and some in the country. I have also taken an active part in the management of several societies; and in this way, I have become acquainted with many of the friends of popular improvement in this country.

When on my first visit at Bungay, the summer after my arrival in England, I found there was no society for popular improvement in the place; and but little encouragement was given me by those with whom I conversed, to attempt the formation of anything of the kind, as a general impression pre-

vailed that they were deficient in materials suitable for such an undertaking. They were also distracted by a dispute in relation to the payment of church rates, which had been carried to a considerable height.

I depended, however, upon my own judgment in these matters; and after making a few observations, came to the resolution to attempt the formation of a society for mutual improvement, which was, in fact, one of the tasks I had set myself, before leaving America.

After returning to London, I collected a variety of apparatus, and some useful books, which I took with me on a second visit to Bungay, the next November (1836;) and after procuring a room that would hold about thirty persons, I offered my services in the formation of a society; but found it slow work to speak to persons individually.

Very little headway was made in this affair, till I hit upon the plan of giving a gratuitous public lecture in a large room, which enabled me to make an impression on the audience in favor of a society for improvement, and to give notice of a second lecture, to be given a fortnight from that time. I also invited those who were willing to assist in this object to come to my room, where we held meetings for exercises, &c. twice a week; and in this way,

we succeeded better than could have been expected. A society was formed, entitled the Bungay Lyceum. Rules, &c. were adopted, and officers appointed to manage its affairs.

A statement of the progress we had made was given to about four hundred persons at my second public lecture, and the thing now became pretty generally known. I continued my exertions for about ten weeks; and before I left, a larger room was provided, the collection of a library, &c. commenced, and everything in relation to the society was going on well. I gave them a parting address, on the importance of knowledge, with the means of its acquisition; and received from them, at its conclusion, a written testimonial, prepared by a committee, in approbation of my services.

On returning to London, I stopped at Bury St. Edmunds, and gave two lectures to the Mechanics' Institution of that place; and thus ended my winter excursion.

Besides these occupations, I have also engaged myself in procuring information relative to the history and progress of Mechanics' Institutions. I found that the origin of these institutions had not been properly treated by previous writers; and after well considering the subject, I determined to attempt the preparation of a more correct account of their his-

tory. This, accompanied with a strong appeal to mechanics on the important subject of education, has been published in a small volume, with the title of "Hints to Mechanics," which has met with a very favorable reception.

After the manuscript of the above mentioned work was prepared, I hesitated some time as to a publisher. I finally determined to offer it to Messrs. Taylor and Watton, booksellers to the London University, as they were chiefly engaged in publications relating to education. A few days after leaving the manuscript, I received a note requesting an interview in relation to the manuscript and other matters. These "other matters," I found, were to solicit my co-operation with the Central Society of Education in relation to school apparatus; and I here actually saw a set of "mechanical powers," which had been imported from a New York manufacturer. They were highly gratified to find one who had been so much engaged in these matters, and who had contributed his share towards giving celebrity to Yankee apparatus. Their pleasure was increased on finding me at leisure, and willing to assist them in putting their plans into a practical train. They had as yet accomplished comparatively nothing in this branch of their operations, though they had been for some

time making efforts to do so—one great obstacle in their way being an inability to find any workmen of a grade between the common artisan and the regular old-fashioned instrument maker, to assist them in the construction of suitable articles.

At first, they wanted me to superintend the manufacture of these articles; but finding I had to contrive many things, and modify others, and taking into consideration the difficulty of finding suitable persons to execute the work, I determined to attempt it myself; and I am now having a shop built, in which to carry out my plans. I have had an excellent workman employed on the apparatus for three months, who has produced some things which give good satisfaction.

As what has now been related seems to be all that it is necessary to say concerning my fortunes since returning to my native land, I must therefore here bring my story to a close.

MISCELLANEOUS PAPERS.

INTRODUCTION.

It is well known to many, that Mr. Claxton, while residing in this country, besides being an industrious as well as ingenious Mechanic, was equally industrious in promoting the cause of improvement and education, especially among the class with whom his business brought him most closely in contact. Sometimes we find him volunteering his services in lecturing on useful topics; at others, employing his pen to arouse in other minds the same love of truth which was active in his own; counting no effort lost which led to the discovery or practical application of some useful truth.

We believe the following remarks made by Amasa Walker, Esq.* in noticing a lecture delivered by Mr. Claxton, before the Boston Ly-

* Mr. Walker was agent of the Factory at Methuen, while Mr. Claxton was there, and was accustomed to take part in the exercises of the Literary Society at that place.

ceum, are no more than a fair expression of the manner in which he is regarded by some of our most respectable citizens, who are best acquainted with his labors in this city:

"We cannot refrain from paying a tribute of respect to Mr. Claxton. He is a man we admire; a self-made man, a mechanic—an industrious, persevering, indefatigable student, and at the same time a laborious and efficient workman at his trade, which is that of a machinist. We have known him for a number of years. His early education was extremely defective and limited, but he did not therefore conclude, as most do, that he must live and die in comparative ignorance and obscurity; on the contrary, he resolved by study and effort, to retrieve the misfortune of his education, and acquire a competent knowledge of the sciences. In conformity to this noble resolution, he devoted his evenings and leisure hours to reading and reflection, and by dint of perseverance, has risen to the respectable standing he now occupies, and is undoubtedly entitled to the honor of being one of the most scientific and intelligent mechanics in the city of Boston, and has the friendship and acquaintance of many of our most distinguished citizens.

We do not say this of Mr. Claxton in order to praise him. He needs not our humble commendation. He is a modest and unassuming man, and has no higher object than his own and others' intellectual improvement; but we say this to encourage and stimulate those who are sighing and repining on account of their depressed condition and their want of education."

Believing that we can give no better additional illustration of this disposition, which shows itself in every part of the foregoing Memoir, we have introduced, under the above title, the following miscellaneous selection of articles, written by or relating to Mr. Claxton, among which are some things referred to in the course of the Memoir, which could not well be inserted there without interrupting the order of the narrative. Among other matters, some articles of an interesting and useful nature, contributed by Mr. C. to the mechanics' magazines, have been thought worthy of being republished in this place.

We begin this selection with a sketch of the origin and early history of Mechanics' Institutions, to the investigation and preparation of which Mr. Claxton has been devoting much time, since his return to his native country. Interwoven with this account is a brief though interesting sketch of the life of Dr. George Birkbeck, for whom he claims the honor of originating these institutions. It may be proper to add, for the sake of explanation, that this honor has by some been adjudged to Professor Anderson, the founder of the institution in Glasgow which bears his name. Attempts

have evidently been made to disfigure or conceal the real truth on this subject; but we feel confident that our friend Mr. C. has given a thorough and correct view of the case.

The particulars of the following account were gathered by him from the Mechanics' Oracle and the Mechanics' Register, together with information obtained from Dr. Birkbeck himself.

ORIGIN OF MECHANICS' INSTITUTIONS.

In tracing the history of Mechanics' Institutions back to their origin, we find that they have descended in an unbroken line from the Mechanics' Class at the Andersonian Institution in Glasgow, which was formed in the year 1800, by George Birkbeck, M. D., then Professor of Natural Philosophy in that institution, and the second who had filled that station. His predecessor was Dr. Thomas Garnett, who had been appointed on the 21st of September, 1796. Professor John Anderson died in January of the same year; and his executors proceeded soon afterwards to carry his benevolent intentions into operation, by commencing the Andersonian Institution. This gentleman was the eldest son of the Rev. James Anderson, minister of the parish of Roseneath, in Dumbartonshire, and was born there in 1726. He was Professor of Natural Philosophy at the University of Glasgow, for a number of years, and in his will he bequeathed his extensive library, apparatus,

&c. for "the good of mankind and the improvement of science."

The history of the origin of mechanics' institutions being blended, as it is, with that of their originator, it seems appropriate to commence with a brief account of the life of this eminent individual, which will, almost of course, include or suggest all which it is at present of importance to say upon the subject.

Dr. George Birkbeck was the youngest son of William Birkbeck, Esq., an eminent merchant and banker of Settle, in Yorkshire, at which place he was born, in the year 1776. At a very early age he manifested strong indications of a disposition for mechanical pursuits, delighting to frequent those workshops in which such articles were made as corresponded with his as yet undeveloped genius, and embracing every opportunity to seize and use the tools of carpenters and other workmen. He was in his childhood solicitous to be employed in a cotton mill, that he might be enabled to examine the movements of the machinery.

After spending six years at school in Newton, on the borders of Lancashire, he was placed under the care of Mr. Dawson, a celebrated mathematician of Sedbergh, in which place and its neighborhood he spent one of the happiest and most instructive portions of his life. He soon afterward became acquainted with the late Dr. Garnett, with whom he spent some time, and was induced to turn his attention to medicine, and finally to adopt it as a profession. His medical studies were pur-

sued for five winters, all in Edinburgh, except the second, which was spent in London, to obtain more accurate information on anatomy. At the close of these studies, he underwent the customary examination for taking a degree in medicine; and having exhibited proofs of possessing the necessary skill, was admitted to that distinguished honor.

Shortly after his graduation, Dr. Birkbeck received a letter from Dr. Garnett, announcing his own appointment to the professorship of natural philosophy in the Royal Institution of London, and his nomination of Dr. B. as his successor in the chair at Glasgow, which he was about to relinquish. Not feeling entitled, at so early an age, to expect great encouragement in medical practice, and wishing to spend a few more years in the pursuit of additional knowledge, Dr. B., thinking this a favorable opportunity to promote his views, consented to become a candidate. The high testimonials, voluntarily sent, when this became known, from many distinguished characters in Edinburgh, secured the votes of a large majority of the trustees; and after the lapse of a few weeks, in November, 1799, he commenced a course of lectures on natural and experimental philosophy, and the more interesting parts of chemistry.

To supply these lectures with the necessary apparatus, strenuous exertions were made; but from the want of an efficient philosophical instrument maker, the greater part was prepared under the superintendence of the lecturer, in the best conducted workshops that he could discover.

Being thus introduced to a direct intercourse with the artisans of Glasgow, many of whom

exhibited a degree of eager curiosity that had no means of obtaining gratification, and a vigor of intellect for the cultivation of which no provision had been made, Dr. B. very soon formed a plan for delivering a series of elementary philosophical lectures, adapted, as far as was possible, to the untutored minds for which they were designed, and to be offered to them free of all expense. The time which he selected for this purpose was Saturday evening, prudently conceiving that it would at least be an admirable substitute for the ordinary mode in which that portion of their time was generally employed, and concluding that if the attempt should not otherwise prove ultimately beneficial, the experiment would at least be safe and rational.

Having matured this plan, Dr. Birkbeck communicated his project to the trustees, in whom the management of the institution had been vested by the will of Professor Anderson, its founder, at their meeting in March, 1800. This was a source, however, from which no encouragement was to be derived, and no assistance obtained. So far as the motive was concerned, the scheme procured commendation, but in other respects, it excited smiles, as the delusive vision of youthful enthusiasm ; and it was even derided when considered in reference to the individuals for whose benefit it had been introduced. Of these trustees, many were intimately acquainted with the wants, the habits and the capabilities of the artisans, yet not one was disposed to express even a favorable opinion of the proposition.

The session being concluded, Dr. B. returned to Yorkshire; and, in a short prospectus sent for publication from that place, of the several courses to be delivered in the next, introduced a notice of the objects and expectations of the new scheme, which commences thus:—"In the prosecution of the design, I shall deliver a series of lectures upon the *Mechanical Affections of Solid and Fluid Bodies*, abounding with experiments, and conducted with the greatest simplicity of expression and familiarity of illustration, solely for persons engaged in the practical exercise of the mechanic arts." The notice closes with the following observations:—"Whatever the arrogance of learning may have advanced, in condemnation of superficial knowledge, and however firmly persuaded I may be that the people cannot be profound, I have no hesitation in predicting that vast benefit will accrue to the community by every successful endeavor to diffuse the substance of great works, which cannot be perused by the people at large; thereby making them reach the shop and the hamlet, and converting them from unproductive splendor to useful though unobserved utility."

The proper business of the institution having fully commenced, a printed invitation was sent to the various manufactories in Glasgow, for lists of the most sober and intelligent workmen which each contained, with an offer of tickets, admitting them to the mechanics' class. One individual, by whom these notices were principally distributed, then unknown to Dr. B., now holds a respectable scientific situation, and still speaks with great satis-

faction of having made this early effort in behalf of popular institutions.*

In consequence of the notices that had been distributed, a few lists were sent in, and tickets having been delivered to the individuals mentioned, the course opened with *seventy-five* pupils. The impression made upon their minds may in some measure be estimated, from the next lecture being attended by *two hundred.* At the third, upwards of *three hundred* were present; and at the fourth, the number amounted to *five hundred.* These the theatre could with difficulty contain; and many others had been refused tickets, exclusively on this account. Nothing could exceed the attention and interest with which these lectures were received; and no audience ever assembled, on any occasion, could exceed in propriety of behaviour this body of artisans and mechanics.

During the progress of these lectures, various letters were received from the hearers. One contained a new plan for an air-pump, another for a steam-engine, and one even for determining the sun's distance by a new method, from an individual who, prior to his hearing the few lectures on astronomy which made a part of this, as well as of the succeeding courses, had never thought upon this subject. Their strong attachment to these lectures was further evinced, by the very handsome present of a silver cup, with an appropriate inscription and devices, delivered to the lecturer on the termination of the course, by Mr. Rober-

* The person here alluded to is Dr. Cleland, the celebrated statistical writer, who has mentioned the fact in one of his works.

son,* an eminent mechanic, on the part of the subscribers. These lectures were continued by Dr. B. for three sessions more, accompanied throughout with similar manifestations of the approbation of his hearers, from their commencement to their termination. One of these tokens of respect was presented by Mr. Robert Thom, who has distinguished himself by his inventions in the Water Works at the Rothesay Mills, near Glasgow. These testimonials of respect and interest embraced his extensive mathematical and chemical course, as well as that which was popular or experimental. In this situation Dr. B. continued until the spring of 1804, when he finally relinquished the professorship in the Andersonian Institution, and was succeeded by Dr. Ure, the present very able and eloquent lecturer.

Subsequent to the above period, Dr. Birkbeck delivered courses of scientific lectures at Birmingham, Liverpool and Hull, upon all which occasions his celebrity as an ornament to the world of science was increased, and his connexions were extended by the intimacy of many other eminent persons.

In May, 1805, the doctor was married to Miss Catherine Lloyd, an intelligent and accomplished young lady, the youngest daughter of Sampson Lloyd, Esq., of Farm, near Birmingham. He afterwards passed a few weeks in travelling, and according to his original intention, he then came to London, where he established himself as a physician; and from his extensive connexions, and the

* This name, in some accounts, is given Roberton, and Robertson.

unlimited confidence reposed in his medical skill, his practice rapidly increased, and his prospects of an honorable independence, as the merited reward of his labors, were in the highest degree flattering.

The worthy doctor's domestic felicity, however, was soon destroyed, by a calamity as unexpected as it was severe, and which it required the exercise of all his fortitude to support. In the month of March, 1807, his amiable wife died within ten days after presenting him with a son; and by this afflicting bereavement, he was plunged into the deepest distress; but by a persevering attention to the important duties of his profession, his mind gradually resumed its serenity, and for several years afterwards, he continued to advance rapidly towards that degree of eminence as a physician which, at the present time, he so deservedly enjoys.

Soon after he arrived in London, Dr. Birkbeck was elected one of the presidents of the Physical Society of Guy's Hospital, to which office he has ever since been annually re-elected. He was also, in the following year, appointed physician to the General Dispensary in Aldersgate Street, and still continues to discharge the important duties of that situation.

Dr. Birkbeck entered a second time into the married state in July, 1817, when he was united to Miss Anna Margaret Gardner, the youngest daughter of Henry Gardner, Esq., of Liverpool, a lady whose many amiable qualities still shed their attractive influence on his hours of retirement.

In the midst of his successful professional career, Dr. Birkbeck still retained his attachment to those

scientific pursuits in which he had formerly attained so much eminence; and the premises of the London Institution in Moorfields, of which he was one of the original projectors, being now completed, he offered to deliver a gratuitous course of lectures on natural and experimental philosophy; and this generous offer being gratefully accepted by the managers, he delivered, during the spring of 1820, seventeen lectures to crowded and delighted audiences. He also delivered other courses of lectures at the same place, in the years 1823 and 1824.

Many years had now elapsed since the early object of his ambition, the formation of a "Mechanics' Class" at Glasgow, had been effected; and having had, during this long interval, but little communication with that city, he had not received much information of the progress of the class. In the supplement to the sixth edition of the Encyclopædia Britannica, article "Cotton Manufacture," Mr. Dugald Bannatyne had spoken of Dr. Birkbeck's plan in the highest terms of eulogy; and had expressed an anxious wish that it should be acted upon in all the principal manufacturing towns; and a letter on the subject of the proceedings of the Mechanics' Class at Glasgow appeared in the Morning Chronicle, in 1822, in which the writer alluded to the meritorious exertions of Dr. Birkbeck, as its original founder, in a manner which could not fail to convince him, that the mechanics of Glasgow had not forgotten the enlightened individual to whom they were indebted for the important advantages which had resulted from his efforts.

In the spring of 1823, Dr. B. received a letter from Dr. Ure, his successor in the professorship at the Andersonian Institution, communicating a series of resolutions entered into by the mechanics of Glasgow, the perusal of which must have excited in his mind that pure feeling of gratification with which philanthropy contemplates the accomplishment of its benevolent purposes. These resolutions contained a powerful expression of gratitude to Dr. Birkbeck, the "liberal-minded projector and founder" of the Mechanics' Class, and a wish that his portrait should be placed in their library, for which purpose a voluntary subscription was opened.

Upon receiving Dr. Birkbeck's grateful acquiescence in their proposition, the mechanics forwarded him a letter, through the medium of their secretary, Mr. Alexander Marshall, from which the following extract is given, as a specimen of the style in which it was written, and to show the just sense entertained by the mechanics of the extent of their obligations to their benefactor:

"Perhaps, when your philanthropic mind first suggested the idea of diffusing useful knowledge among mechanics, it did not occur to you that your benevolent scheme would be crowned with such eminent success as subsequent events have proved. But the oak springs from the acorn;—the triumphs of truth over prejudice, though slow, are nevertheless certain, and, if properly directed, permanently beneficial to mankind. You formed your scheme of improvement from an intimate acquaintance with human nature; and it must be gratifying to you to learn that your philosophic

foresight has not been disappointed. You judged that the mental lethargy of the operatives towards science arose from no infirmity of their mental powers; and you judged right. You traced it either to a total neglect, or an improper direction of their faculties to objects unworthy of their notice. You undertook the generous task of giving *the first impulse*, and of directing their attention to studies worthy of their pursuit; and the experience of twenty years has proved, beyond a doubt, the beneficial effects resulting from your system of education."

Soon afterwards, from some cause or other, the mechanics separated themselves from the Andersonian Institution; and having formed an independent Mechanics' Institution, which is still in a prosperous state, the members, with the same sentiments of grateful recollection which had dictated their previous resolution, nominated Dr. Birkbeck as their patron.

Early in 1823, the doctor was revolving in his mind the practicability of carrying a similar plan into effect in the metropolis, for which purpose, as a preparatory step, he was preparing for publication an Essay on the Scientific Education of the Working Classes. From the variety of his occupations, this essay was still in an unfinished state, when his attention was again attracted to the subject by an address to the mechanics of London, which appeared in the Mechanics' Magazine, edited by Mr. Joseph Clinton Robertson. Of the promptitude with which Dr. Birkbeck immediately offered his able co-operation in the proposed plan for establishing the London Me-

chanics' Institution, an extract from the above named work will afford the most conclusive evidence.

"It will, we feel assured, give peculiar satisfaction to every well-wisher to the scheme, to learn that the *first gentleman* who responded to our invitation was the *public spirited* and *philanthropic individual* who, to adopt the language of a resolution of the Mechanics of Glasgow, of the 22d of February last, had the honor 'of unfolding, first of all, with the commencement of the nineteenth century, the temple of science to the artisan'—we mean Dr. George Birkbeck, formerly professor in Anderson's Institution, Glasgow; now physician in London.

"Who but a man of a *great and a generous mind*, flinging aside all the prejudices of education and habit, soaring above most of those around him in his views of human capability, could have been the first, in the long lapse of ages, to step forward and invite the humble artisan, 'however scanty his means, or obscure his condition,' to come and draw water from the same stream at which a Galileo, a Bacon and a Newton had drunk of immortality?"

At the public meetings which were subsequently held at the Crown and Anchor Tavern, on the 11th of November and the 2d of December, 1823, Dr. Birkbeck was unanimously called to the chair; and to his important assistance, in conjunction with many other gentlemen, the London Mechanics' Institution is chiefly indebted for its original establishment, and the success which has since marked its progress. When the first

officers of the Institution were elected, on the 15th of December, 1823, Dr. Birkbeck was unanimously chosen President, in which situation he has ever since devoted his great talents to the promotion of its interests, with a degree of zeal and perseverance which has seldom been equalled, and never surpassed.

Having thus imperfectly performed the task of detailing the principal circumstances which have distinguished the progress of this truly excellent individual, it would be in vain to attempt a further illustration of his character by any feeble praises which our own feelings might dictate. Of the high estimation in which his genuine worth and extensive philosophical attainments are held, by those who have had ample opportunity of appreciating them, some idea may be formed by the honors which have been conferred upon him by numerous scientific and other institutions. We have already said that he is President of the London Mechanics' Institution, Patron of the Glasgow Mechanics' Institution, Physician to the General Dispensary, and one of the Presidents of the Physical Society of Guy's Hospital. He is also President of the Meteorological Society, of the London Chemical Society, and of the Medical and Chirurgical Society of London; Vice President of the Surrey Literary Institution, and Patron of the Spitalfields Mechanics' Institution.

At the first anniversary dinner of the Patrons and Members of the London Mechanics' Institution, which was celebrated on the 2d of December, 1824, after having on that day laid the first stone of their Theatre, with appropriate ceremo-

nies, Mr. Brougham, the early friend and coadjutor of Dr. Birkbeck, portrayed with his usual eloquence the incalculable benefits which must result from the general diffusion of scientific knowledge among the operative classes of the community; and congratulated the assembly on the number of mechanics' institutions which had, within the short space of twelve months from the establishment of the central institution in London, under the learned President's auspices, sprung up, as if by magic, in most of the principal manufacturing districts in the kingdom. Since that period, the number has been considerably augmented; and in all human probability, the author of this "great and good work" will witness, for many years to come, the beneficial effects of his philanthropic exertions. But when the irrevocable decree shall be fulfilled, which mingles the dust of the enlightened philosopher with that of the untutored Indian, and confounds all distinction in the "cold obstruction" of the grave—when the heart that now glows with virtue and benevolence shall cease its pulsations forever, and the hand that is stretched forth to the assistance of unobtrusive merit shall be extended no more, the name of Dr. Birkbeck will be remembered by countless multitudes with respect and veneration; in ages yet unborn it will be associated with those of the greatest benefactors of mankind, and the establishment of mechanics' institutions will be his passport to a glorious immortality!

The history of more than twelve additional years of activity and usefulness, in the life of this worthy benefactor of science and art, might be

given, (for the works from which the above account has been chiefly gathered were published in 1825;) but we shall not attempt the task. It need only be observed that Dr. Birkbeck is still very actively engaged in promoting the objects of popular education, and frequently gives lectures in various parts of the metropolis, especially when the wheels of a new society are to be put in motion. We had the pleasure of hearing him lecture at the Mechanics' Institution, on the mechanism of the human frame, on the evening of the 24th of April, 1837. This was the birth day of the princess Victoria; and notwithstanding the great attraction occasioned by the illuminations and festivities of the evening, the lecture was well attended.

It only remains to make some remarks which may, it is hoped, serve to set in a satisfactory light the true answer to the disputed question, to whom the honor really belongs, of having originated mechanics' institutions.

Our reply to this question is, that it belongs to Dr. Birkbeck; and the reasons for giving this honor to him are plain and easy to be understood. It is acknowledged by all parties that he originated the Mechanics' Class at the Andersonian Institution in Glasgow, in the year 1800, that it has been in being ever since, and that from this example have sprung the various institutions of a similar character in Great Britain and other parts of the world.

But some say that the idea originated with Professor Anderson, the benevolent founder of the institution in which the Mechanics' Class originated.

What the precise ideas of that gentleman might have been, we cannot tell; and those who assert his claims do not give the clause in his will touching this matter. We are not, however, entirely in the dark on the subject, for we can come at the thing by making a comparison between the two classes taught by these gentlemen. Professor Anderson's *antitoga* or gownless class, dwelt upon by the writer of the article on "Mechanics' Institutions" in the Encyclopædia Britannica, lately published, was very different from the one proposed by Dr. Birkbeck, or else how are we to account for the conduct of the Trustees of the Andersonian Institution; for when this new scheme, as it was called, was communicated to them, the motives of the proposer were commended, but in other respects "it excited smiles, as the delusive vision of youthful enthusiasm; and it was even derided when considered in reference to the individuals for whose benefit it had been introduced. And although many of the trustees were intimately acquainted with the wants, the habits and the capabilities of the artisans, yet not one was disposed to express a favorable opinion of the proposition." And this is not to be wondered at; for if we are rightly informed, although Professor Anderson had left his valuable library and apparatus in their charge, yet they had little or no funds at their disposal at that time, notwithstanding the "ample fortune" mentioned in the article in the Encyclopædia above alluded to. Indeed, it was not until after he had been engaged three years, that Dr. Birkbeck received any compensation, when the Trustees presented him with £200. Nor does the fact that

they hired a place and fitted it up for the Andersonian Institution, look as though an ample fortune had been left to their management.

The facts of the case are simply these—that previous to this time they had a class at the Institution very similar to the antitoga class; but the one that Dr. B. proposed was quite different. A guinea was paid by those who attended the former class, whereas the artisans were admitted to the latter free of all expense.* Moreover, the new class was intended for a set of persons altogether different from those who had been in the habit of attending the former one. Of these, the few practical men who attended were principally masters—persons who had some taste for the sciences, and to whom the expense was no object of consideration; but the new class was composed of sober and intelligent workmen—those who labored with their hands, and whose tastes it was necessary to cultivate, before they could feel like devoting their time and money to the acquisition of science. And to be successful in this, it was necessary for the teacher to exhibit that kind sympathy for them which is so natural with him, and which, to his praise be it said, he attributes to the early teachings of a kind-hearted mother.

So little assistance did Dr. Birkbeck receive from the Trustees, that the greatest economy was necessary on his part, in order to carry his plans

* It should be observed, however, that at the second session they taxed themselves one shilling a head, and in this way, raised £25, there being 500 of them. This money Dr. B. would not touch, but gave £20 to the assistant, and £5 to the trustees, for the use of the hall, lights, &c.

into execution. And if we were capable of the task, nothing could please us better than to sketch the portrait of this young enthusiast; and in the grouping, on one side, to represent him in the shop of an artisan, in the act of giving instructions how to make some article of apparatus for his lectures, and surrounded by eager listeners, who had involuntarily dropped their tools from a laudable curiosity to catch an idea of the intended use of the work; and on the other side, to represent him in the act of printing cards for the mechanic class, which, as well as an address to the mechanics of Glasgow, he actually did with his own hands, using a small press for this purpose, which had been left at the Institution by Dr. Garnett. This, we conceive, would be a fit subject for the historical painter.

But notwithstanding we are willing to go thus far in asserting Dr. Birkbeck's claim to the honor of originating mechanics' institutions, we do not lose sight of those favorable circumstances without which his exertions would not probably have been turned that way, or after having been made, might have been lost to posterity, for want of a successor able and willing to carry forward so noble an undertaking. We cannot too highly value the benevolence of the founder of the Andersonian Institution, or the perseverance and energy displayed for so long a period by Dr. Birkbeck's successor, the talented Dr. Ure, who has been the teacher of the Mechanics' Class so long, that at one period it was almost forgotten who first formed it.

The following extracts from the article in the Encyclopædia Britannica, to which Mr. Claxton refers in the above remarks, comprise the substance of what is there said concerning the history of Mechanics' Institutions, and in particular, of the Andersonian Institution.

"It has been a subject of very considerable controversy, to whom the honor of having originated those institutions ought to be attributed. Some have contended that to Professor Anderson, the founder of the institution in Glasgow which bears his name, it is alone due; because, in addition to the clauses in his will, which especially provide for the formation of a class of *manufacturers* and *artificers*, he had for a period of thirty years, while professor of natural philosophy in the University of that city, opened a class to which manufacturers and others had access, for the purpose of becoming acquainted with the fundamental principles of experimental physics. Others, again, have affirmed, that although Professor Anderson had such an intention in view when he framed his will, it was only through the exertions of Dr. Birkbeck, the second professor of the Andersonian Institution, that the project was carried into complete and practical effect. It appears to us, however, that to Professor Anderson is certainly due the merit of having originated the *idea* of instructing that previously neglected, but valuable portion of the community. But while we give to that admission all the weight to which it is entitled, we are of opinion, that in so far as regards the usefulness of the idea

when carried into effect, the merit is due to Dr. Birkbeck. Professor Anderson was in the frequent habit of visiting and spending several hours in the workshops of the mechanics of Glasgow; and freely entering into conversation with them. Among others, he was often found at the workshop of our illustrious countryman, James Watt, then a watch-maker, in Glasgow; and it was in consequence of the avidity with which the workmen availed themselves of the theoretical information which, on these visits, he was in the constant practice of imparting, that he first conceived the idea of bringing within their reach those principles of science, the attainment of which had hitherto been confined to the higher and wealthier classes.

He then commenced within the walls of the university, a course of Lectures on Natural Philosophy, for the especial benefit of that class of society, and divided the course into two branches; one meeting four times a week, in which the mathematical principles of the sciences were considered apart from experimental illustration; and the other, which met twice a week, consisting entirely of those branches which admitted of such illustration, and in which the principles of mathematics were less called into operation. This latter class was regularly and numerously attended by a great many manufacturers and others engaged in operative occupations, and was continued for several years, with great success. He called it his *antitoga* class, in contradistinction to his regular academic attendance, which was denominated the *toga* class. It was in consequence of the decided improvement in the arts and manufactures of Glasgow, which,

from that time, became very evident, and which Professor Anderson justly attributed to his instructions, that he conceived the truly philanthropic intention of bequeathing his ample fortune for "the good of mankind and the improvement of science." In the provisions of his will, there was an especial reference to the formation of classes upon the principle of that which he had himself so successfully taught within the walls of the university.

Professor Anderson died on the 16th of January, 1796; and at a meeting of his executors, held on the 23d of March following, it was resolved to carry his intentions into immediate effect. Accordingly, on the 21st of September, of the same year, Dr. Thomas Garnett was elected first professor of natural philosophy.

The lectures, however, were at first only popular. Dr. Garnett, in 1800, was appointed to the chair of natural philosophy in the Royal Institution of Great Britain, founded at the suggestion of Count Rumford and Sir Joseph Banks; and Dr. George Birkbeck was elected in his stead. It was then, *upon the suggestion of Dr. Birkbeck*, that the trustees were enabled to give full effect to Professor Anderson's favorite idea, as expressed in his will, of affording instruction in experimental philosophy to the artisans of Glasgow. Such was the origin of the first mechanics' class, which has now been taught for upwards of thirty-six years, with increasing success and advantage to this interesting class of students.

But important as was this era in the history of the class which was thus instituted, it was not until

upwards of twenty years afterwards, that the example was followed by any other city in the kingdom. At length, however, in 1821, the School of Arts, for the instruction of mechanics, was formed in Edinburgh; and within a year or two afterwards, the example was followed, and another institution of the same nature was originated in Glasgow, in consequence of some differences which had arisen between Dr. Ure, (Dr. Birkbeck's successor in the Andersonian Institution,) and the students who attended his operative class. A great many of these left the Andersonian, and founded the Mechanics' Institution, of which Dr. Birkbeck, at their solicitation, consented to become the patron. About the same time, the London Mechanics' Institution was founded; and within a very few years after this period, there was hardly a city of any note in the kingdom which had not institutions of a kindred description."

We believe Mr. Claxton contemplates the preparation of a more extended and general account of Mechanics' Institutions, both in England and this country, than it has been possible to furnish in this volume, from the documents within our reach. We have hopes that he may be enabled to give to the world a more complete history of these institutions than has ever yet been published.

LONDON MECHANICAL INSTITUTION.

A BRIEF history of this society has been given in the preceding memoir, in the language of Mr. Claxton himself, its originator, and probably its chief supporter. It was, we have reason to believe, the first society ever formed *by mechanics among themselves*, for improvement in useful and practical knowledge. The only institution having in view similar purposes, which preceded it, (so far as we can learn,) was the Mechanics' Class of Dr. Birkbeck, at Glasgow; and of the existence of this those who formed the "Mechanical Institution" seem to have been entirely ignorant.

From its unfortunately short duration, from the narrowness of the circle within which it became known, and still more, perhaps, from the humble character of those who composed it, this society has not made any conspicuous figure in the annals of benevolent effort in behalf of the human mind. And yet, we doubt not, it contained within itself the undeveloped germ of much more real utility and benefit to the artisan classes, than have characterized some institutions which have taken the first rank, as promoters of science and the arts.

The following paragraphs comprise the principal part of a circular written by Mr. Claxton himself, which was the first printed document, (or public notice,) relating to the formation of this society:

Every art is improved by the emulation of competitors.—*Johnson.*

A few Mechanics having associated themselves together for the purpose of establishing a Society of Ingenious Working Mechanics, of all descriptions, provided they are respectable men of good character and a studious disposition, wish for a few intelligent persons to step forward and assist them in forming a Committee, and composing a set of Rules and Regulations for the conducting of a Society which has for its object the study and improvement of the Arts of this kingdom.

We are well aware that there already exist many valuable Societies for the promotion of the Arts, but they do not seem to be adapted to the capacity of a Working Mechanic. We do not mean as to their terms of admission or subscription afterwards, but the recommendation they require seems to be the grand obstacle, combined with the very scientific style of language and the gentleman-like appearance of their Members; so that the class of people that compose those Societies, and the class of people that we should wish to see possessed of the leading principles of the various branches of science, do not seem to have any inclination to associate together, the reason of which we cannot exactly determine upon—but it appears to be a sort of

customary pride, that does not allow of the various degrees of men in high and low rank to unite in a body; and so far, it may be a very good thing, as it obliges men who wish to set themselves forward in the world, to endeavor to obtain distinction by their meritorious exertions.

By taking a view of the case in this light, it would seem advisable to form a Society a few degrees below those already in being, in order to make a path wherein the industrious Tradesman may walk, and to give him an opportunity to improve the talents with which he is blessed: the advantages that would arise from the formation and proper conducting of such a Society would be numerous.

Such a Society would afford both rational and useful amusement, in attending once a week to hear a lecture on some useful branch of science, or the discussion of some question on mechanical or philosophical pursuits. It would create in us a disposition to pass our leisure time in a way much preferable to that already practised by too many. It would make us better ornaments to society—better to ourselves, our employers, and consequently to our families.

As men's minds are not all alike fitted for study, we invite such as feel themselves inclined, to come forward and join in establishing a society which will afford to them benefits above those of other men. As there must be some of all sorts, let us advance as far as we can; and as it falls to our lot to follow the practice of the arts for the support of our bodies, let us in our leisure time endeavor to improve the mind, by studying those points on which the prac-

tice is founded, called the Theory, not forgetting the principle laid down by Mr. Owen—"*That there always remains among a certain number of persons, a sufficiency of talent to instruct and amuse.*"

The society must evidently have contained some rude materials, which should find it necessary, "for the purpose of preserving good order"—for so it stands in the original Record Book of the Society, still in the possession of Mr. Claxton—to pass resolutions that, "if any member comes into the room intoxicated, or does curse, swear, or use any obscene language or discourse, promote gaming, propose a wager, or introduce a stranger without leave of the President, he shall be fined sixpence for each offence."

This, however, is precisely what was to be expected of a club of any kind, gathered from among the uneducated mechanic classes, at that period. The wonder rather is, that there were so many among them who could agree, as they did, to pursue together the paths of science, while laboring under disadvantages so great as theirs.

The following is the plan which they laid out for themselves, and which they seem to have pursued steadily enough while they kept together :

"The members of this Institution to meet once a week, and a lecture to be given once a fortnight; the intervening evenings to be for the discussion of questions, reading extracts, and settling the affairs of the society.

"This Institution is to depend upon the gratuitous exertions of its own members for lectures. Each member will be expected to lecture in rotation, or read extracts from rare and valuable works, to occupy not less than one hour."

We do not find much account of the matter or method of their discussions or lectures, but the following minute, which occurs on one leaf of the Record Book, may perhaps suffice to satisfy curiosity:

"Oct. 28, 1817. Resolved that the cause of the draught in chimneys before lighting the fire, and of the extra draught after lighting the fire, be for discussion next Tuesday evening."

A notice of this society given in the London Mechanics' Magazine of February, 1831, will appropriately close this account:

The Institution in Southampton Buildings, not the first London Mechanics' Institution.

We always thought that it was a fact beyond all dispute, that the present London Mechanics' Institution was the first establishment of the kind, in the British metropolis; and though it has been far from realizing our anticipations of utility, we

have seen reason enough, in the portion of good it has done, to deem it a just matter of self-congratulation, that *by us*, that institution was planned, and *by us* organized. Some documents, however, have been recently transmitted to us from Boston, in the United States, by Mr. Claxton, a mechanic, who a few years ago emigrated thither from London, and who is honorably distinguishing himself among his adopted countrymen, by his efforts to inspire them with a taste for scientific inquiry, which, we freely acknowledge, throw a very different light on the matter. It appears from these documents, that several years before *we* thought of calling upon the mechanics of London, to form an association for cultivating a knowledge of the principles of the arts they practice, some of these mechanics had already done so among themselves, and of their own accord ; though from some (unexplained) cause or other, the institution of *their* formation never attained to any magnitude—nor ever acquired any considerable degree of publicity. The institution we allude to, was established in August, 1817—about five years before the foundation of the present London Mechanics' Institution—and differing as little from it in name as in character, being called "The Mechanical Institution." In an Introduction to the code of Laws of this Mechanical Institution, "Printed by J. Mills, Shoe-lane," it is said to have been "established for the purpose of disseminating useful knowledge among its members and their friends, by attending lectures and discussions on various branches of science;" and then follows a just, though rather florid exposition of the advantages of such knowl-

edge to men of business. "The time and talents of individuals are in general so much taken up about the affairs of life, as to render them incapable of much progress in the various branches of knowledge. But still, knowledge is desirable, as it is a bridge that will carry us in safety over the widest and deepest streams: it is at once the fountain of true happiness, the real source of enjoyment, and an inexhaustible mine of wealth. Moreover, it is the only acquisition not subjected to the vicissitudes of human existence—that of which the most determined effort of tyranny cannot bereave the possessor." The object of the members is still more explicitly declared, in the code of laws itself, to be "the mutual instruction of each other on all subjects connected with the arts, sciences, manufactures, and commerce; but more particularly on such matters as lead, or may seem to lead, to any improvement in the mechanical arts;" and a provision is added, that "no topic of theology or politics be discussed by this society." The resemblance, in short, between the two institutions, is altogether most complete—so much so, as to leave the founders and promoters of the one last in date, nothing beyond a greater share of success to boast of.

Mr. Claxton was, we presume, the principal promoter, if not the founder, of the society; and it is not improbable that its decline and extinction, may have been owing to that gentleman's emigration to America.

METHUEN LITERARY SOCIETY.

This Society, in which Mr. Claxton took so lively an interest during his short residence in Methuen, seems to deserve special notice, from the fact of its being one of the earliest of those societies which have since been so generally established, under the name of Lyceums.

The first meeting, we learn, was held Dec. 7, 1819, when it was voted to accept a Constitution which had been prepared; and the persons present constituted themselves a society, for the purpose of reading, and the promotion of useful information, with the title of "The Methuen Social Society for Reading and General Inquiry." A number of useful and interesting works were read by the society, in succession. Not long after the formation of the society, it contained between forty and fifty members, male and female. Afterwards, the interest abated, and the number of members diminished. Finally, in the autumn of 1823, there were but four or five regular attendants; and a consultation was held on the subject of dissolving the society.

The further history of the society, and the part taken by Mr. Claxton in resuscitating the

interest of its members, has been already given in his own words, in the Memoir.

We need only give, in addition to these remarks, an extract from an anniversary Address delivered by Mr. C. before the society, in which he will be seen to have had in his mind's eye at that time, the very plan of the much talked of "Lyceum system," which has since been so successfully and so extensively put in operation :

"Who will have the heart to deny the utility of such an institution as ours ? Will it not prepare its members for future usefulness in the world ? Will it not make us better ornaments to society—better to ourselves, our neighbors and our country. * *

"There is no way so well calculated to obtain knowledge, as by a society like our own, composed of individuals of all ages and both sexes, possessing various talents, and pursuing different occupations, each throwing in his mite for the good of all, and receiving the benefit of the contributions of all the others. * * * * * *

"If societies of this kind were well supported in every town in this Commonwealth, and their influence spread abroad until they reached each other's sphere, the great mass of the people would soon find more rational amusement than they do at present. That such a state of things may soon come to pass, is my sincere wish."

BOSTON MECHANICS' LYCEUM.

The following particulars, (supplementary to the account given in the preceding Memoir,) respecting the origin and early history of this institution, of which Mr. Claxton was President, are from an article in the "Young Mechanic" for August, 1832:

The first meeting in favor of forming a Mechanics' Lyceum in this city (Boston,) was called by Mr. Josiah Holbrook, Feb. 5th, 1831. Mr. Timothy Claxton presided, and Mr. W. S. Baxter acted as Secretary. The evening was occupied by the discussion of this question—"Has any class of the community stronger inducements or better opportunities for mental improvement than practical mechanics?" which was decided in the negative. The meeting adjourned to Feb. 12th, for the discussion of another question, and to take into further consideration the subject of forming a Lyceum. At this meeting, a proposition was made to form an association to be called the "Union Lyceum," and another, to form one to be called the "Mechanics' Lyceum," both of which were referred to the next meeting, which was voted to be held Feb. 19th. The latter proposition prevailed at this meeting; and a committee was appointed to draft a Constitution, to be reported at an adjourned meeting, Feb. 25th.

The following persons were elected officers for the first season:—Timothy Claxton, President;

G. W. Light, Secretary; James Cooper, Treasurer; Wm. S. Damrell and Joseph Wightman, Curators.

At the first regular meeting of the Lyceum, a system of exercises was adopted, consisting of an elementary course of Mechanical Philosophy and Geometry, interspersed with discussions of interesting questions.

The subjects of the lectures were treated upon by the members of the Lyceum, seven of them taking parts on the evenings of the lectures, and each one occupying about a quarter of an hour.

At a meeting held June 7th, (the same year,) the following subjects for lectures were adopted, for the second term, viz., Architecture, Political Economy, Botany, Geology, Natural History, Astronomy, Biography of Practical Men. The members were left to choose their own subjects for essays. At a subsequent meeting, it was voted that Declamation should be added to the regular exercises of the Lyceum, which was afterwards found to increase the interest and usefulness of the society.

We are able to confirm the testimony of Mr. Claxton, that this society has been the means of doing much good, in the way of eliciting and cherishing a taste for the acquirement of useful knowledge, among those who came under its influence. The closing remarks of the writer of the above quoted article will explain the Society's views of the utility and advantages of their plan:

"As to the success of the Lyceum, thus far, notwithstanding its number of members has been small, the improvement of those who have devoted their attention to it, has exceeded the anticipations of the projectors. They now feel confident, that the plan of having the exercises conducted by the members alone, is not only in accordance with the true Lyceum system, but far more productive of solid improvement, than the mere attendance upon popular lectures. In the one case, the members acquire a habit of doing their own studying and speaking, and consequently of calling into exercise the faculties of their own minds, and using the means for improving their own manner of delivery; while in the other, most of the hearers of popular lectures retain little of the instruction they receive, and are too apt to go away with the impression that, because the lecturer's duty is performed, their own task is as certainly completed. If the former obtain only a *smattering* knowledge of science—which we maintain is not the case—the latter do not obtain even *that*. It is not my design to derogate in the least from the real merits of the popular system of conducting Lyceums. While kept within its proper sphere, it may be of extensive benefit; but I do maintain, that popular lecturing ought not to be the *regular* exercise of any institution, the professed object of which is *mutual* improvement. I am aware of the difficulty of giving very great popularity to an association which depends wholly upon its own resources for advancement in knowledge; but still I am of opinion, that the improvement of a Lyceum depends as much upon the faithful exercise of its own powers, as that of an individual does upon his own efforts."

As a matter of curiosity, the following brief article, published by Mr. Claxton in the London New Monthly Magazine in 1816, is inserted here, it being the first specimen of his composition ever put in print.

THE IGNIS FATUUS.

In some works I find the ignis fatuus described as a meteor, chiefly seen in dark nights, frequenting meadows, marshes, and other moist places, known among the people by the names of *Will-with-a-Wisp*, and *Jack-with-a-Lantern*. We are further told, that it seems to arise from an exhalation, which, being kindled in the air, reflects a sort of thin flame in the dark, without any sensible heat, and that it is found flying along rivers, hedges, &c., because it there meets with a stream of air to direct it. In other books, I have found the above account of the ignis fatuus contradicted. The light produced is there said to proceed from the lantern fly, whose body is very brilliant, and the under side of its wings glazed; these, when extended, serve as a reflector. A gentleman asserted that he followed one for several hours, which would fly against the wind, mount over hedges, houses, &c.—This was not the effect of the wind.

The question is, whether this light is produced by a vapor or a fly, and whether it is calculated to do any mischief? Correct notions on this subject would greatly tend to remove the fears of ignorant country people.

The following, from the London Literary Journal of 1818, is no less interesting than the preceding, evidencing, as it does, the disposition of Mr. C. to turn everything to a practical account, with particular reference to the benefit of the mechanic classes.

A PAPER FOR ALL.

To the Editor of the Literary Journal.

SIR:—Permit me to congratulate you on the subject of your paper, and at the same time to offer a word of advice to the mechanics of London and its vicinity. As you wish to make the Literary Journal A PAPER FOR ALL, and as you publish it on Saturday morning, I advise such of my brother mechanics as are in the habit of spending sixpence of a Saturday night, for the sake of company or variety, to make a trial of your paper, as there is to be found in it both variety and utility; and it will serve the whole family, who, after all, will have a good book to show for the money.

A JOURNEYMAN SMITH.

P. S. Some may say, "I should like it better if there was a little more of mechanical information to be found in the Literary Journal." In my opinion, the best way to supply that is, for mechanics to become correspondents; and I will venture to hope you will not turn away any useful information.

Several articles here following are selected from among Mr. Claxton's contributions to the Young Mechanic, of which some account is given in the latter part of the Memoir. To those who are unacquainted with that work, as well as with Mr. C. himself, they will not, we think, be found wanting in interest; and those who are familiar with both will, no doubt, gladly recognize their old acquaintances in this new dress.

HINTS ON THE ECONOMY OF HEAT,

AND PREVENTING ACCIDENTS FROM FIRE.

Many distressing cases of fire are known to originate from stove pipes, and flues of furnaces; also from sparks coming in contact with wearing apparel, and other combustible substances. Now if the number of stoves and fire places could be greatly reduced, a corresponding diminution of these conflagrations would necessarily be the consequence.

The question which naturally suggests itself, is, how can we dispense with our stoves and fire places? I answer, pull down your chimneys, and place them under your streets in a horizontal position, three feet or more below the surface of the ground, and let them serve as conduits for hot air. The air may be heated at an establishment located

near some navigable canal, or good land conveyance, where fuel can be had at the cheapest rate; and it may be forced along these subterraneous tubes, by a steam engine, or other adequate power, and supplied to the inhabitants as water and gas now are.

Let us picture to ourselves a plan for a town as follows:—The dwelling houses to be built without chimneys or fire places; the heat, when required, to be supplied by the town or by private companies, as might be found best. At the back of every house, a kitchen, having a fire place, should be built; and any other out houses or sheds that might be wanted. The back door might be covered with sheet iron on the side next the kitchen, to prevent the fire from communicating to the house, in case the kitchen or sheds were on fire.

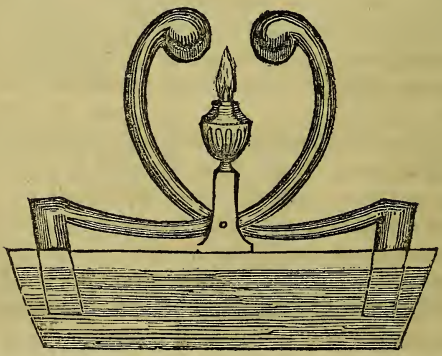
Mechanics' shops should be built unconnected with dwelling houses. A number of mechanics, having shops near each other, might unite in the employment of a steam engine, to drive lathes and other machinery. If the various branches of art were carried on in the vicinity of each other, much time might be saved, both to the mechanics and their customers.

The plan of the streets is of much consequence, as it respects the facility of finding a fire, when an alarm is given. I was once struck with the admirable plan of a spider's web. The animal keeping watch in the centre, how easy it was for him to start in any direction, that an unlucky fly might get entangled in his net. I thought at the time that this would be an excellent plan for the streets of a town, with a watch tower in the centre, and a de-

pot for fire engines, together with a market, and other establishments requiring a central situation. Every district might also have its fire engine. By keeping a good look-out of a night, the direction of a fire might be quickly ascertained; and an index that swivelled round might point towards the fire; or the town might be divided into sections, and the number of the section where the fire was, presented alternately to all the radiating streets.

NEW AIR ENGINE.

The annexed figure is selected from among a number of drawings of machines of this description: some of them swing like a pendulum. I have set at work several models of various forms, on similar principles.



In this machine there are two copper balls, each having a tube open at the lower end, which terminates in a vessel of water. When one of the balls is placed over the lamp, some of the air which it contains is expelled, and escapes at the open end, and rises through the water. If the other ball be now brought over the lamp, the air will be rarified in that also, while a vacuum is forming in the first. At the same time, the water rises in the tube above the level of the water in the vessel. This will now preponderate, and bring the first ball over the lamp again. The water will now be driven out of its tube by expanding the air, while the other tube is filling with water, to be brought down in its turn; and so on alternately.

PERPETUAL MOTION A PERPETUAL NOTION.

Mechanics seem to be as far from solving the question relative to a perpetual motion, as they were two thousand years ago; and yet many of them are still troubled with the old mania. No reasoning will deter them from the pursuit. I suppose the reason why those that know better do not endeavor to stop this kind of speculation is, that they think as Bishop Wilkins did two hundred years ago, when he compared them to the man who dug the vineyard for a hid treasure, who, although he did not find it, yet made the ground

more fruitful. But working at models of this kind is certainly a very expensive and tedious way of studying the science of mechanics. Reading and attending lectures with experiments, are much better. The Academy of Sciences in Paris have resolved that they will have nothing to do with pretended discoveries of a perpetual motion. They have decided that the invention is impossible, and that all attempts at the discovery of it are a mere waste of time. The quadrature of the circle, and the trisection of an angle, are also, in their opinion, problems impossible of solution.

There is a wide difference between a perpetual motion and a self-mover, which latter is, indeed, what the former term is used to signify. The former moves perpetually, and may be any human contrivance put in motion by the ebbing and flowing of the tides, the waters of a never failing cataract, variations of the atmospheric pressure, the expansion and contraction of metals and other bodies; in fact, any motion that the great Author of nature has made, will, if we can hook our machine to it, serve this purpose. But the latter—a self-mover—show me one, if you can? I will enclose it in a box; and ask this question—Does this machine move without the aid of any cause beyond the limits of this box, and yet, after it has moved for a definite length of time, will it appear as likely to continue as it did at first?

There are only two kinds of motion with which we are acquainted—mechanical and chemical. In all mechanical operations, there is a loss of power. In the steam engine, it is common to allow one third of the power of the steam for the friction of

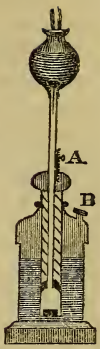
the engine. One pound of power applied to any machine whatever, will not raise a pound weight through as much space as itself descended. Motion occasioned by chemical action must come to a stand; for the materials acted upon are continually undergoing decomposition, or are altered in such a manner that they do not return to their former state, and in the same place.

In illustration of this, take the steam engine for an example. The fuel of the fire is acted upon chemically, and is decomposed; and no art can return it to its former state. So of the water in the boiler: although the steam will return to the state of water, yet some of it will be decomposed, and form an oxide on the sides of the heated metal; and another portion will escape beyond our reach. Gunpowder is a source of great power, but the materials of its composition are dissolved in one discharge. For fear of being tedious, I will conclude with a brief quotation from Mr. Banks:—"When a man tells me he can construct a water wheel in such a manner that, when once put in motion, it shall raise water to keep itself moving, or that he has constructed a pump in such a manner that one man may do the work of ten, I pay the same attention to him as if he told me he could create a system of worlds, and command them to move."

THEORY AND PRACTICE.

It will not be denied, that the prosperity of this country depends in part on our manufactures; and these again, depend on improvements in science and the mechanic arts. No man can be said to be a finished workman, if he is ignorant of the *theory* on which his practice is founded. A man who is well versed in arithmetic and geometry, together with the laws or properties of simple machines, (improperly called mechanical powers,) with their effects, when combined, as in compound machines, —I say, a man that understands these, and the laws of attraction, of simple and compound forces, the various properties of aeriform and watery fluids, with some knowledge of chemistry,—such a man, if he sees a plan on paper, hears it described, or reads of it, especially if he is a practical man, will be able to judge of its merits more correctly, in less time, and consequently at less expense, than if he were merely a workman. In the latter case, he must construct his model. If this is done in a bungling manner, it will not perform, but he may conclude it would if it had been well made. This is all guess work. I recollect reading an observation which goes to confirm this; "that if a plan of the steam engine had been shown to Archimedes, he would have been able at once to say what it was capable of doing—that is, whether it would work, and what power it possessed." Now if our mechanics understood the principles of science, what time and expense would be saved!

HYDROSTATIC LAMPS.



In the winter of 1828–9, I tried a number of experiments, with a view to the invention of a lamp of simple construction, that should answer the purpose of a complicated and costly French clock-lamp which I had seen. Several of these lamps had been imported for our wealthy citizens, at about $75 or $150 a pair; and which, when out of order, it was difficult to get repaired.

They are ingeniously made to pump up the oil by clock-work, which is moved by a spring, from a reservoir in the foot of the lamp, to a small cistern in the upper part, which is furnished with a wick on the argand principle. If the machine should pump up more oil than is wanted, the surplus runs down a small waste pipe into the reser-

voir again. Fig. 1 represents a French clock-lamp, with the machinery enclosed in the lower part of the pedestal, marked A, and the oil in the part B. There are two tubes inside the pillar C, one to convey the oil to the cistern at top, and the other to carry down the surplus oil.

My first attempt was to make a lamp (which is represented at fig. 2) on the principle of the hydrostatic bellows. I procured a bladder of about three inches in diameter, and capable of holding half a pint of oil. The neck of it I secured to one end of a small tube eighteen inches long; and to the other end of the tube, a glass lamp, having a hole through the bottom, was cemented. A lead weight, with a hole through it to receive the tube, and shaped to fit the upper part of the bladder, was so adjusted that it would press the oil from the bladder just half way up the glass lamp. The bladder and weight were enclosed in a tin case, which answered for a foot; and the tube would move freely up and down in the centre of the top of the case. The lamp, thus prepared, was lighted and placed on the mantel-piece; and after burning undisturbed for nine hours, the oil stood rather higher in the lamp than it did at first.

This lamp will burn much longer than the common kind, on account of the greater quantity of oil in the reservoir; and will give a better light, because the oil can be kept always at the most suitable distance from the flame, by the adjustment of the weight. These are important points, and cannot fail to be appreciated, by persons wanting a uniform light for a considerable length of time.

The only difficulties I experienced with this lamp were, that in very cold weather, the weight was not sufficient to raise the chilled oil through so small a tube; and if the lamp was placed in a situation where it was subject to disturbance by violent shaking, like that of striking the table on which it stood with the hand, or jumping on the floor, the oil would be put in motion, and raised higher in the lamp.

The lamp just described may be called self-acting; but I made several others, in which the oil was forced up by hand. One of the best of these, which has been in use in my family for about five years, I will now describe. It is represented at Fig. 3, and consists of a glass lamp, and a tube passing into a case below, as in Fig. 2; but instead of a bladder being fixed at the lower end of the tube, it is formed into a piston, and slides into a larger tube, which, with two valves, one at the bottom of the large tube below the piston, and the other at the bottom of the glass lamp, closing the end of the small tube, forms a complete pumping apparatus. The piston is depressed by the finger applied at A, and is raised by a spiral spring, which surrounds the small tube above the piston. The oil is put into the case at B, in this lamp; but in the self-acting one, it is introduced at the top of the glass lamp; and in both, if the oil should by accident be forced over the top, it will pass into the case where the tube enters.

A NEW DISCOVERY.

APPRENTICES' LIBRARY ASSOCIATIONS.

A DISCOVERY has lately been made, which promises to be of great benefit to all classes of the community, especially to our mechanics; and particularly the younger portion of them. This contrivance, when put into extensive operation, possesses so much power, that the effects produced by the steam engine dwindle into insignificance, when compared with those which it is able to produce. It is believed that suitable materials for the construction of these machines exist in every section of the country; indeed, some persons are of opinion that there are but few towns in which materials are not to be found, suitable for the work.

I have had an opportunity of witnessing the operation of several of these machines, within a few months. One or two of them pleased me so much, that I was induced to attempt a description of them. The materials require considerable judgment in their selection; and they must be seasoned for years before they are fit for any part of the work. The main-spring or first mover, and some other parts, should be made of well tempered materials, for the several wheels, levers, &c., to be acted upon, are of such a nature, that they are subject to some irregularities in their movements. These difficulties, however, may be overcome by skilful management.

Like most kinds of machinery, the better the several parts are fitted and polished, the more likely they will be to perform well. But it appears necessary that the various rubbing parts should be kept in motion for some time before the machine can be said to be finished; for, after the workman has done his best, there will still remain many sharp edges, as well as protuberances and eccentricities, which had entirely escaped his notice, or whose removal was beyond his art.

Those persons who have devoted most time and money towards perfecting this invention, do not wish to monopolize the business by a patent, but would be glad to furnish all the assistance in their power towards establishing them in various parts of the country. These machines are not of that class called labor-saving, but their introduction will have a direct tendency to lessen the expenses of many persons. The laboring classes will reap their full proportion of the benefits, if they act wisely, and adopt them without delay; and there is no danger of too many being introduced, as the article manufactured is not likely to become a drug in the market.

I was present the other evening at the anniversary celebration of the "Boston Mechanic Apprentices' Library Association," at Chauncey Hall; where an Address and a Poem were delivered by two of the members. These exercises appeared to give general satisfaction to the numerous audience that attended on this occasion. This is certainly one of the most useful institutions in the city. The members have the sole charge of an extensive

library, and they rent a room where they hold two meetings a week, one for lecturing and debating, and the other for the distribution of books. At both meetings, when no exercises are going on, they amuse themselves by reading the papers, which they are supplied with by the kindness of our publishers. Their exercises create a demand for scientific books, that might otherwise be slumbering on their shelves. In addition to their library, they have commenced a cabinet of minerals, and specimens of the various kinds of wood, &c. Does not this afford a fine chance for the young mechanics of Boston to improve themselves?

Apprentices' libraries exist in various cities and large towns in the Union; and many more might be formed with advantage, especially if the young folks have exercises to perform. They will then have some inducements for study. When they are free, they will make good members of societies for mutual improvement. It seems necessary that there should be a link of this kind, in the chain of that education which begins as soon as we have any discernment, and continues as long as our faculties are preserved. We are learning all the time, and our minds will be filled with knowledge, of some kind or other. Then it must be a great discovery, to find a plan by which even the laboring classes may, by associating together, improve themselves in useful, practical knowledge.

AMPHIBIOUS STEAMER.

The amazing success with which steam has of late been applied, both on land and water, surpasses the most sanguine expectations of the mechanical student; and almost realizes the imaginations of the poet, who says,

> "Soon shall thy arm, unconquered steam, afar
> Drag the slow barge, or drive the rapid car;
> Or, on wide waving wings expanded bear
> The flying chariot through the fields of air."

But before we are prepared to mount into the air, by the force of steam, it will be necessary to make another improvement, so as to unite the steam boat and steam carriage in one machine, that will be capable of travelling both on land and water. I believe this can be done on a small scale, for pleasure if not for profit. A boat can be made light enough to answer for the body of a carriage, and yet strong enough to bear a little beating about at sea. At least, it would do to cross a pond or small lake, and perhaps a river whose current is not very rapid. It will be necessary to have wheels to run on the ground, which may serve also for paddle wheels; or what would be still better, it might have separate paddle wheels similar to those in common use. The ends of the boat must be turned up, so as to enable it to pass in and out of the water without wetting the deck.

Having faintly described this new steamer, let us now imagine a little excursion with it. Suppose all the passengers safely on board, and she starts from some central part of the city, and enters the

bay by a gently inclined road. Very soon after the fore part of the boat touches the water, the fore wheels will leave the inclined plane; and when she is afloat, the paddle wheels may be set in motion. (In crossing some rivers, velocity enough may be given in descending, to drive her across to the inclined plane on the opposite side without the use of paddle wheels.) We may now visit the islands in the bay, catch a few fish, and afterwards proceed to Nahant, or pass up the beach at some suitable place, and return by land, crossing the ferry from Chelsea, to the place from whence we started.

The following engraving will illustrate the thing more clearly. The name I have adopted is the Alligator; and I have endeavored to give it somewhat the form of that animal.

[Steamer Alligator, entering the water.]

SOCIETY FOR THE ENCOURAGEMENT OF MECHANICAL GENIUS.

"The products of a man's mind are as much his property as those of his hands."

If this assertion be true, ought not something to be done to secure the credit to those who spend much time and thought in perfecting useful inventions? The patent office is not adequate to this. It has been stated that very few of the patents would stand if tried in a law-mill. There are so many points to be attended to—such as originality, the oldest patent, the claiming of too much or not enough, the not being sufficiently explicit, and not furnishing proper drawings or models, &c., that the expenses of a law-suit are so frightful that a poor man dare not engage in it.

Several plans have been proposed to effect this object. One is, for a company, after examining the project, to raise the needful to carry the plan into execution; said company to become co-proprietors.

I will take the liberty to propose a plan. Suppose a society were formed in Boston, with a small fund—say one or two hundred dollars a year. Let this society hire a room, or what is still better, procure one at the expense of the state, for a place of general deposit of the articles of inventors. Let them invite inventors from all parts of the state to send their plans, models, &c. to this room for examination by suitable committees, appointed on various subjects. But instead of giving the successful inventor a sum of money, give him a certificate, which will cost but a trifle, and he will

thereby obtain a good name, which is better than rubies. Let this be done in public, and nothing will have a greater tendency to encourage him in his vocation. Publish an account of all the inventions annually. Undoubtedly such a book would sell well; and the community would thereby know the meritorious inventor from those that pirated other men's inventions. In a word, it would have a tendency to establish a correct feeling in the community.

We may mention, in connection with the preceding, that at the annual meeting of the Massachusetts State Lyceum, in 1832, an address was delivered by Mr. Claxton on the subject of assisting inventors, after which he introduced the following preamble and resolution:

"Whereas, in the opinion of this meeting, many of our enterprising mechanics, for want of scientific knowledge, suitable books, and proper advice, frequently incur an expense of time and money to very little profit, in endeavoring to perfect useful inventions, which might have been avoided, in part at least, by timely application to some person competent to judge of their merits; and whereas it is believed to be in the power of this Lyceum to do something towards removing this evil; therefore,

Resolved, That this Lyceum adopt measures to remedy this defect, by appointing one or more committees of advice, procuring a place of deposit, inviting inventors to send in their plans, models, &c.—and by such other means as may be deemed expedient and practicable, to promote the object."

This resolution was unanimously adopted, after some discussion, and referred to the Curators, to be carried into effect in such a manner as they might deem expedient. Unfortunately, this, like too many other good plans, failed, through neglect, of being carried into execution.

WARMING ROOMS.

The following is a description, with drawings, of a method which I suppose might be useful in very cold weather, to contribute to the comfort of those who cannot afford to keep fires in their sleeping rooms. Among many expedients which have been adopted for this purpose, some are unhealthy, and others absolutely dangerous; we might, for instance, mention the use of warming pans, hot bricks, bottles of hot water, and burning charcoal, the last of which, in close rooms, is known to have been often a cause of death.

During the late severe weather, my mind was turned to this subject; and I endeavored to fix upon some method which would be free from the disadvantages of those above alluded to, and at the same time equally efficacious.

It occurred to me that most small families have the convenience of heating water by their common culinary fire; and that considerable heat was required to raise three or four gallons of water to the

boiling point, and that if this water, so heated, could be placed in a small bed-room, so that its heat might be quickly distributed, (the fire-place, doors and windows being closed,) the room would be warmed, at least so as to be comfortable—the water being made ready just before bed-time.

The next step then was, to provide that the heat of the water should be quickly abstracted, by exposing a large surface of it to the air, or the conducting material of the containing vessel. Several forms of apparatus suggested themselves, two of which are represented in the engravings, which it is proposed to construct of tin or copper.

Fig. 1.

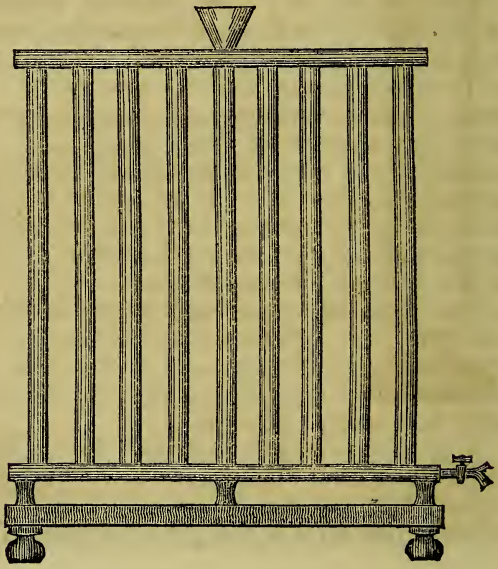


Fig. 1, is a vessel consisting of several flat or oval shaped tubes, which are closed, except at the top, where is a tunnel to pour in the water; and at the bottom is a cock to discharge it. It will be observed, that the tubes are connected at top and bottom, so that from one tunnel all the tubes are filled.

Fig. 2.

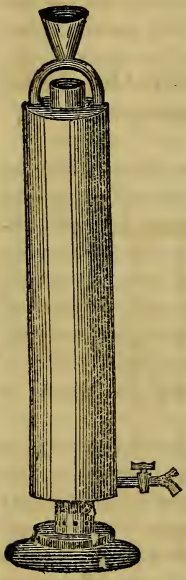


Fig. 2, consists of two flattened or elliptic tubes, one within the other, between which the water is to be poured; and the water will be thus exposed within and without to the air. A current of warm air will pass up the inner tube, which is perforated with small holes at the bottom, and open at top. A tunnel and stop-cock are provided, for the entrance and discharge of the water.

The effect of both instruments will be at once perceived; and it will be observed that the danger from fire, as well as from impure or contaminated air from the heating apparatus, is entirely obviated.

The following is the substance of an article written by Mr. Claxton about the time when the "ten hour system," so called, was agitated among us. Whatever opinions may be entertained about that subject, the remarks here made appear to us sound, and well worthy of consideration.

THE PRESENT CONDITION OF THE WORKING CLASSES.

In regard to the opportunities of the working classes for regular and systematic studies, under the present irregular system of labor, I would observe, in the outset, that I believe these classes generally have many opportunities for study which they neglect; and the common cry of want of time comes with such an ill grace from those who make it, that the common impression is, that if more leisure time were possessed by them, it would be no better employed.

There are two things to be rigidly observed, or very little improvement can be expected—which are, industry and economy; but our industry must be constant, and we must economize time as well as money. These things appear to be absolutely necessary, in order to warrant any hopes of success in our efforts towards improvement; and with them, a man must be dull indeed, or placed in a very peculiar situation, if he cannot make considerable progress.

Let us take the example of a carpenter, or a bricklayer, if you please. He works from sunrise to sunset in the summer; but in the winter he has so much leisure that the time hangs heavily on his hands. Why is it that such a man does not adopt some regular and systematic plan of study, during the slack season? I suppose the reason is, because it is not fashionable, or he does not know how to set himself about it, or, what is quite as likely to be the case, he does not realize the immense value of a good education. He will perhaps reason in this way: What benefit would it be to me to know ever so much? Should I get any more pay for my day's work? Would it enable me to handle the trowel or the plane any better? And so, instead of spending the winter in Boston, and attending to lectures, useful reading, &c., many a man goes into the country, and spends the leisure season in lounging about stores and taverns, in bad weather, and in fair weather, practising the sublime sciences of squirrel hunting, turkey shooting, &c.

But take the case of those who are busy all the year, those, for instance, who labor in manufactories, who are employed from sun to sun in summer, and from daylight to eight o'clock in the evening in winter. Some of them find time for improving the mind, and all of them find it for amusement; and if some plan were devised to blend instruction with their amusement, their onward course would very soon be apparent. That many opportunities of study are neglected by the mass of the people, is proved by the fact that those persons among the working classes who have become eminent for knowledge, are those who have

done the most work, who have been the most industrious, and who have economized their time as well as their money.

It will without doubt be acknowledged, that apprentices in Boston, at the present day, have a far better chance of acquiring knowledge than Franklin had when a boy. Books of various kinds are at hand, and numerous societies are open to them, all calculated to afford greater or less facilities for the acquisition of useful information. There are also many day and evening schools, where particular studies may be pursued. In fact, it appears to me that in Boston at least, the means of improvement are abundant; and that the *will* is the principal thing wanted.

EXTRACTS FROM LETTERS.

The two following extracts from letters of Mr. Claxton, will serve to show the cheerful disposition which he was accustomed to manifest in the prosecution of new and untried plans. The first comprises nearly the whole of a letter written to his brother in England, from Russia, on the event of leaving that country for the United States:

"Dear Brother:—I suppose you are by this time ready to say that Russia is a land of silence. It was not my wish to remain silent so long; but

as I have been in a state of great uncertainty for the last twelve months, I did not think it of any service to trouble you with the passing events of the day ; for there are not many days without some fresh thing to engage our attention : and as I thought you would hear how I was through my wife's brother, I rather chose to defer what I had to say to you to some future opportunity. And now, it seems, I am compelled to say something.

I am about leaving St. Petersburg for the United States. I have had this determination for about eighteen months; and I assure you, I have been tired of this country and our concern, for that length of time. I made great effort to get away last summer, but could not. I hope, however, you will not think I have made myself unhappy during this time. Thank God, I have too much philosophy for that.

Last summer I *played* thirteen weeks, without receiving a farthing of wages ; but could not get a passport to leave the country, until all the American vessels were gone, and a passage to England would have been dangerous. My employers kept me out of my passport as long as they could ; and as I received it so late in the season that it was of no use to me, I made a new engagement to stay another winter. I recovered all my lost wages, and had my weekly wages as before ; so that I am in a much better condition to travel now, than I then was.

Perhaps you may say, How came you to think of America?—We have a worthy man here, who has been out from England two years, and being single, he has boarded with us for nearly that time;

and in fact, seems like a part of the family. He is a good mechanic, clerk and draughtsman, understands the French language, music, &c., and is generally accomplished. He has some money and a good stock of tools. We have matured our plans together; and I hope, by the blessing of God, to be able to do something some time hence, for you. The person of whom I have been speaking is about thirty-six years of age; his name is Richard Fellowes, and his parents reside in London. He has been thinking of America for some years; but it has been difficult for men in the metal trades, to get from England to that country, especially with their tools.* We have had opportunities of perusing works on the subject, as well as letters from persons residing there.

If I do well, perhaps there may be an opportunity for you, as your trade is good, and there is no difficulty of your leaving England.

I have written without reserve, and shall leave you to consider of it two or three months. After you receive a letter from me in America, I shall expect your thoughts on the subject. I do not expect, if you should determine to follow me, that it can be done this year.

In referring to your letter which my wife brought me, I find you rather alarmed at your increasing family. In America, we are told, children are hailed as in the patriarchal ages; they are 'towers of strength,' &c.

* It was for this reason that, when Mr. Claxton left England for Russia, he went under the assumed profession of a gardener.

I shall not fail, if please God I am spared, to give you all the information in my power. I firmly believe I could not do so much good to myself and family by returning to England, as otherwise, and am therefore determined to try this adventure. I can at least return to England, afterwards, if I do not succeed."

In less than two years after his arrival in this country, Mr. Claxton was deprived of his amiable friend above mentioned, (Mr. Fellowes,) by his death, which occurred early in January, 1825; and it became his melancholy duty to communicate the intelligence of this event to the friends of the deceased, who had a father yet living in England.

In a letter dated at Copenhagen Roads, (on his way from Russia,) addressed to his wife's brother in London, Mr. Claxton thus calmly and good-humoredly remarks upon the prospects before him:

"You may say, Why go to Boston, rather than to New York or Philadelphia? I would reply, that we were ready to go, and there were no vessels going to those parts; to wait for them would run away with more money than travelling in America would cost; and we stand as good a chance in or near Boston as anywhere else, because people do not emigrate so much to that part.

At any rate, I think we may stop there till next summer, and see how things turn out. We have learned, since leaving St. Petersburg, that there is an oil gas company about being established this spring at Boston. It is a place of considerable trade, and has a number of populous villages about it. At any rate, an industrious working mechanic need not be in want of the necessaries of life, in any part of the United States. We have no fears about us, if it please God to give us our health."

In a subsequent letter to the same person, Mr. C. gives the following brief account of his voyage and arrival at the place of his destination:

"We sailed from Cronstadt on the 12th of June, and on the 22d, I wrote you from Copenhagen Roads. On the 4th of July we lay becalmed between the Orkney and Shetland Isles, on the north of Scotland; and on the 26th, we made the Banks of Newfoundland. After passing along the coast of Nova Scotia, on the 12th of August we saw land belonging to the American continent, (in New Hampshire.) On the 13th, at eight o'clock P. M., we dropped anchor in Boston Harbor. Next morning we went on shore, where we put up at a tavern, at a dollar each per day.

On the 21st, we went to lodge at Mr. Philpot's —an old shopmate of mine at Mr. Braithwaite's, in London, whom I accidentally met with in Boston, where he has been about six years."

RUSSIAN RECOMMENDATION.

Perhaps we need no better proof that a man who is so disposed may make himself useful almost everywhere, and to every body, than is given in the experience of Mr. Claxton. The following highly favorable recommendation, (alluded to on page 41 of the Memoir,) which he received on leaving Russia, from the Company in whose employ he had been engaged, will show how his abilities were appreciated in that quarter of the world, and how well he succeeded, notwithstanding the various and depressing disadvantages under which he labored in the business which he undertook:

"During a period of three years, having had ample opportunity of proving the talent and witnessing the sobriety, steadiness and diligence with which the bearer, Timothy Claxton, has uniformly pursued the business entrusted to his care, we consider it a tribute due to him, to furnish him with this most indubitable testimony of our unequivocal approbation of his conduct, during the period of his engagement with us.

Having put up the apparatus at the government establishment in this city, the Glavnoi Stab, for lighting that department with oil gas, and attended the making of the gas himself the first winter, viz., during February, March, April and May, 1821,

and having at all times made himself useful in other branches of the gas business, we, the undersigned, do not hesitate to recommend him to any person in want of such a man."

THE YOUNG MECHANIC.

The history of this periodical reflects a credit upon Mr. Claxton, which he does not seem to have thought of appropriating to himself, in his notice of it, on page 90 of the Memoir. Although it was, as he says, "got up and conducted for some time by six members of the Mechanics' Lyceum," yet it is well known by those most concerned in the enterprise, that Mr. C. was in reality the prime mover and the *soul* of the work, during the greater part of its existence; and that upon him, together with Mr. Wightman, devolved nearly the whole responsibility of sustaining its scientific character. Although its circulation was not extensive, and there were many discouraging circumstances connected with its publication, he devoted his time and attention to it with a zeal and perseverance which a person of his then slender means could ill afford, and which could only have sprung from a noble desire to elevate

the character of the class with which he was connected by his profession, and thereby to benefit the community at large. And his efforts were not without success; for the work not only proved a valuable auxiliary to the Lyceum alluded to, but was evidently the means of inciting many young mechanics to engage in the study of the departments of science connected with their business, and of eliciting the results of scientific investigation and experiment from mechanics and others of various degrees of education.

Two volumes of the work were published with the title "Young Mechanic," when it was found to be impossible for the Association to proceed farther without additional aid, and some material alteration. The following remarks, from a subsequent account of their doings, published in the Mechanic, explain the situation of the matter at this period:

"The Association, having labored for the magazine gratuitously since its commencement, and also incurred some loss in its publication, considered it against their duty to pursue the object farther, unless an arrangement could be made to place it upon a more firm basis. This they had learned could not be done without enlarging it, making a variety of improvements, and raising the price.

Under these circumstances, it was thought best

to make an effort to increase the number of the Association, by inviting individuals interested in the progress of the arts and sciences to become members, and also to solicit donations from gentlemen interested in its objects. This measure was vigorously pursued, and the result has far exceeded their anticipations. They found other individuals willing to assist, not only in forwarding the magazine, but in prosecuting measures for the encouragement of mechanical genius."

After the increase of their number, it was decided to form an Association, under the name of the MECHANIC FUND ASSOCIATION; the principal object being to collect funds, by the members taking one or more shares in the magazine, of twenty dollars each, and by donations, as just stated—which fund was to be devoted to the publication of the magazine, and the advancement of the Mechanic Arts in other ways, if there should be any surplus means. A committee was early appointed to solicit donations from gentlemen of other professions, whose efforts were quite successful. After sending a circular explaining their objects to various persons, well known as men of an elevated and philanthropic character, they received donations from the following gentlemen, some of which were very liberal, besides a few small sums from others:

J. P. Cushing, Esq.; Nathaniel Bowditch, L.L. D.; Hon. Abbott Lawrence; Amos Lawrence, Esq.; Hon. Theodore Lyman; Messrs. W. & S. Lawrence & Stone; Hon. P. C. Brooks; P. T. Jackson, Esq.; Dr. Geo. C. Shattuck; Hon. S. T. Armstrong; Hon. Theodore Lyman, Jr.; Phineas Upham, Esq.; Geo. W. Lyman, Esq.; H. F. Baker, Esq.; George Darracott, Esq.; Hon. Charles Wells; Hon. S. A. Eliot; R. G. Shaw, Esq.; Samuel Cabot, Esq.; Stephen White, Esq.; F. C. Gray, Esq.; Hon. B. T. Pickman; B. B. Grant, Esq.; Daniel Treadwell, Esq.

Capt. Alexander Parris, President of the Association, also gave liberal sums from time to time, for the promotion of its objects; and the members generally were not backward in making any sacrifices which their circumstances permitted. We may mention, in particular, Mr. Elisha Tower, (successor to Mr. Claxton in the presidency of the Mechanics' Lyceum,) and Mr. Dunbar B. Harris, as among the most efficient in this cause.

The magazine was now enlarged, the title being changed to "Boston Mechanic," and was continued with spirit for two years after the donations just alluded to were received. But the Association being then square with the world, and feeling unable to incur any further responsibility in sustaining the work, on account of other demands upon their time and money, and being unwilling to make another appeal to the benevolent public, they suffered it to be

discontinued, by being united with the Scientific Tracts.

Thus terminated this humble effort of a few individuals to benefit their brethren of the mechanic classes; though they accomplished even more than might have been expected, when we consider the fact that hardly any work of the kind, however valuable, has ever been known to support itself in this country, much less, to prove a profitable business. But, as they say in closing their remarks on the discontinuance of the work, they have the "satisfaction of a well founded belief, that not a little good has been done by the publication of the Mechanic, and that it will still continue to do good, wherever its bound volumes shall be read."

MR. CLAXTON'S INVENTIONS.

It is hardly necessary to add anything to the account which Mr. Claxton has given of his inventions, especially his air-pumps, in the Memoir; but the following remarks of Dr. Jones, the able conductor of the Journal of the Franklin Institute, made on the occasion of noticing his patent air-pump in that Journal,

will show that his articles are not only in extensive use, but approved of by the highest scientific authority, and deserving of the reputation they enjoy:

"The patentee of this improved air-pump is a manufacturer of philosophical apparatus in Boston; and on a visit to that city, about three months since, we had an opportunity of inspecting his establishment, and of examining many of the instruments made by him. It has been his aim to simplify the various articles which he makes, in order to supply the demand from Academies and Lyceums, at a price within the means of such institutions; and we were both gratified and instructed by the singular skill with which he has accomplished this purpose, without any sacrifice of utility. In several instances, we should have given the preference to the simple articles of his make, as better calculated for the business of instruction than the more complex and costly ones usually employed, and described in the books."

THE BUNGAY LYCEUM.

We are unwilling to omit the opportunity of making some allusion to the exertions which Mr. Claxton has been making in his favorite field of labor—that of aiding the progress of

intellectual improvement in societies organized for this object, since his return to England. Besides lecturing in various places, and before some of the most respectable institutions, we find him engaging with heart and hand in the work of establishing a Lyceum in the town of Bungay, (adjoining his native place,) on the American plan, and sparing no time or pains to ensure the successful accomplishment of this object. The Committee of the Lyceum, in an address to the public prefixed to their printed Rules and Regulations, say—

"This institution owes its origin to Mr. Timothy Claxton, of America, who, during his recent stay in this town, expressed his solicitude that the uncultivated portions of the Juvenile and Working Classes of his native place might have an opportunity of acquiring information on subjects promotive of social and moral improvement, and thus be deterred from the commission of *evil*, (the ever fruitful result of ignorance,) and be incited to the practice of *good*. His various thinkings, and frequent conversations with others, resulted in the adoption of a plan for mutual improvement, similar, in many respects, to societies which exist, with growing advantage, in the United States, as well as in England; and from the former of which its present title is derived."

The following testimonial of the kindly feeling and respect with which this Society regard

Mr. Claxton's efforts in their behalf, illustrates still more fully the success with which they were rewarded:

To Mr. Timothy Claxton, late of Boston in America.

We who are deputed by the Society known in this town by the name of the Bungay Lyceum, undertake to address you, our founder and preceptor. You, sir, are just on the eve of taking leave of us; and as a great degree of uncertainty prevails whether we shall in this life all meet again, we cannot let this opportunity pass, without presenting you with this small memento of our gratitude, for your past invaluable services. Although we have long felt the desirableness of an institution like this, yet, from the general impression on the public mind, that there was not literary taste enough in Bungay to find nutriment for the growing wants of such a society, and on the other hand, finding that high intellectual culture was but rarely blended with a true sympathy for the working classes of society, we had almost despaired of our wishes ever being realized. But you, sir, knowing and feeling that men are not made useful, good or great, by merely being told to be such, but that human nature wants to be acted upon, not only supplied us with the nutriment which our understandings needed, but kindly condescended to enter our ranks, to take us each by the hand; you called us to duty and privilege, showed us the expansive nature of our own souls, and thereby led us to estimate the end for which our rational natures were given us.

You have opened to us a path to intellectual improvement, and induced in us a desire to advance therein. We do, and shall ever gratefully remember the time, property and energy you have so liberally bestowed on this society, both in its formation and through its first or incipient stage; and we earnestly hope that your labors may not have been spent in vain; that by a gracious Providence, your valuable life may be continued through many years of health and usefulness; and we earnestly trust we shall, at no distant period, be favored and honored with your presence again, when you may have the satisfaction of seeing the society in a prosperous state.

On behalf of the Society,

ABR. ASHER LEVY.
SAMUEL TIBNAM.

BUNGAY, DEC. 29, 1836.

"HINTS TO MECHANICS."

WE have had an opportunity of glancing at this interesting volume, in the preparation of which Mr. Claxton was assisted by our friend, B. B. Thatcher, Esq., while on his recent visit to England.

The book is enriched by several beautiful wood engravings, one of which represents the scene where Dr. Birkbeck first conceived the

noble plan of instructing the working men, of which Mr. Claxton has succeeded in showing him to have been the original designer. The investigation of this matter, as may be supposed, was attended with some trouble. "I find," he says, in one of his letters, "more difficulty in collecting the information wanted than I expected. London is so very large, that it is difficult to find out what it centains, as persons generally are acquainted with only a small portion of it, and there has been until recently no vehicle of information on this subject. The London Magazine is got up to supply this deficiency."

Among the results of his researches into the history of Mechanics' Institutions, he informs us that "the version given to the world by the conductors of the Glasgow Mechanics' Magazine is not correct; and that what is stated in Mr. Emerson's address before the Boston Mechanics' Institution corresponds with that account."

An example or two of the manner in which the Hints to Mechanics has been noticed by the English press, will not only show what kind of reception the book has met with from the public there, but also serve to give a general idea of its nature and contents. The London Literary Gazette says—

"This is a most meritorious work; a work full of good sense and useful information. After introducing the author himself, far better than a portrait, it treats of the desirableness of a sound education, of the habits, faults and vices incident to mechanics, and their reform and improvement; of the evil effects of ignorance, and the beneficial effects of knowledge; of the application to business, of the employment of time, and, in short, of every subject of interest to the mechanical orders, and to the community to which they belong, in which they form so important a part. There is a degree of solidity and applicability in the whole which deserves our highest praise."

In the following commendatory note from Dr. Birkbeck to Mr. Claxton, on the receipt of a copy of the Hints to Mechanics, after mentioning his late severe indisposition, he expresses his full satisfaction of the statements there made, in regard to this subject, as follows:

"I have had an opportunity, at length, of perusing your 'Hints,' and approve of them, as well as feel satisfied with the manner in which you have managed the subject of my claims, if so they may be termed. It is at least an honest and correct statement of facts; and be the impression or opinion what it may, that is produced by the exposition, it cannot fail to render the matter more clear and satisfactory than anything which has before been written, to all persons who inquire

into the matter with minds honest and unprejudiced. I feel therefore obliged as well as satisfied, by the position in which I have been placed by you.

I hope that your book will be extensively read by the working classes, as they cannot fail to be benefited by the admirable practical admonitions and encouragement which you have introduced. Your style is certainly well adapted to reach the understanding and secure the conviction of the operatives.

I remain with great respect yours truly,

GEORGE BIRKBECK."

1 Cornhill, Boston, June, 1839.

LEONARD'S ARITHMETIC.

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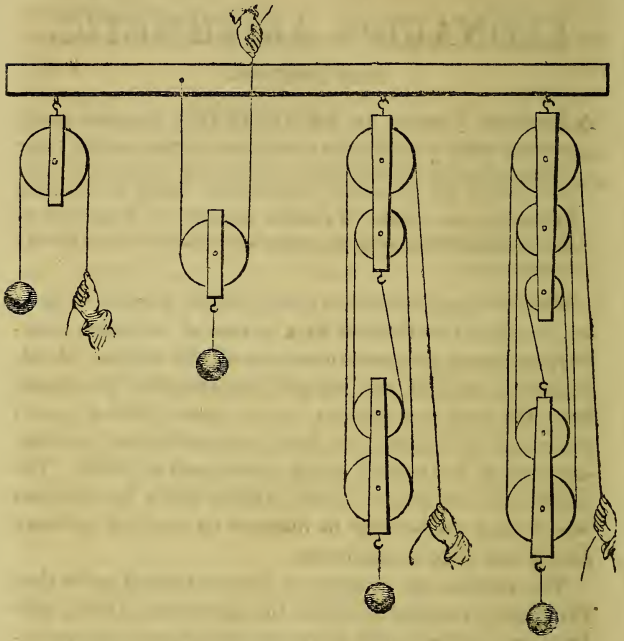
A Practical Treatise on ARITHMETIC, wherein every principle taught is explained in a simple and obvious manner; containing numerous Questions, and *combining the useful properties of former works with the modern improvements.* Being a Complete System in one book. To which is added, a Description of BOOK-KEEPING, with Examples for Practice.—By George Leonard, Jr.

This work commences in a very simple manner, so as to be completely understood by a person of moderate capacity, having no previous knowledge of the subject. It advances by regular and almost imperceptible gradations, from the easy and obvious, to the more difficult parts; rendering the labors of the scholar agreeable and amusing, and saving the teacher much trouble and vexation. The reason of every rule is made evident, either by questions which lead the scholar to discover its truth, or by short, simple and lucid explanations.

The articles are arranged in a more natural order than that usually employed, so that the operations in many subjects are performed by merely applying preceding principles, without any new rule. As soon as any principle is explained, it is often employed in succeeding parts of the work, thereby recalling it, fixing it in the mind, and showing its practical application.

There is no superficial or mutilated account of any subject; all that is important concerning it being given; and this is done, not only within the bounds usually employed, but often so as to enhance the simplicity of the work.

The subjects of Mensuration and Simple Machines are clearly explained, and illustrated by neat cuts, of which the following is a specimen:



The subject of Book-Keeping will be found to be treated in a most useful and practical manner; for it contains not only the proper specimens and explanations, but the scholar is required to form a book, and arrange in it transactions which are stated in a promiscuous manner.

Copious Questions are placed at the bottom of each page. They resemble their appropriate answers in phraseology, whereby much time and trouble is saved the learner, as well as the instructer.

The simplicity of the work, the regular gradations by which it proceeds from the easy and obvious parts, to those which are more difficult, combined with the numerous questions, and the peculiar adaptation to their respective answers, render this arithmetic superior for the purpose of Self-Instruction. It is plain and practical, and therefore well fitted for the Farmer and Mechanic. No arithmetic contains more that is useful for the Merchant, or better adapted to his purpose; nor is the mode of reasoning and general plan ill suited to the Scientific or Literary Student.

☞ Although this work has been out of press but a few weeks, several distinguished teachers have decided to introduce it into their schools, and it has received the following

COMMENDATIONS.

"We are frank to confess that we had seen new arithmetics and geographies and grammars, all claiming to be improved ones, till we were ready to be heart sick at the sight of them. But here comes one more, and circumstances having led us to examine it, we will with all honesty, make one more confession, which is, that we like it. Without making very high claims, without any claims which are immodest, it really seems to us to embrace important improvements One of these improvements consists in placing Federal Money after Decimal Fractions, and not before them, as has usually—we know not but always—been done. The Square and Cube Root are also made more intelligible than in any work of the kind we have seen. The articles on Mensuration and Simple Machines are of first rate importance. Book-keeping, or as the author modestly calls it, a *description* of book-keeping, seems to us highly desirable in a work of this kind, and we are glad to witness the present effort. We do not value the questions at the bottom of the pages as highly as many teachers do; nevertheless they may be useful to some persons. In general, however, we are very much pleased with the work; and we wish it were introduced into all our schools."—*Annals of Education, Boston.*

"This work seems destined to take a high place among the useful treatises of the same class, for which the literary emporium is distinguished. We have not given it the examination proper for a thorough opinion of our own, but many of our best critical authorities of the dailies at the north, speak of it in terms which leave no question in our mind as to its merits. Gentlemen who have experience, too, in mathematical teaching, commend it to us warmly. We doubt not those who are on the watch among us for improved school books, will do well to examine Mr. Leonard's.—*U. S. Gazette, Philadelphia.*

"We have seen this work highly commended, and have come to the conclusion that it deserves great praise, and is likely to take rank accordingly among our most useful and popular school books. It is well known how many of these treatises are mere impositions—speculations—yankeeisms; got up to go a little while, like a well-lacquered Connecticut clock, or a broken-winded horse in a jockey's hands. This is no such book. The pains bestowed on it are manifest on every page; we have never seen a more conscientiously industrious and careful work of any kind. We think, too, that this labor is well bestowed; that it tells well. Mr. Leonard thoroughly understands his subject; and his heart is in it. He has seen and suffered the deficiencies of ordinary books, and has determined to produce one which should avoid all these, and at the same time retain all that is worth retaining about them, including whatever may be considered the real arithmetical improvements of the day. This object we believe he has accomplished in a remarkable degree. We approve specially of the good sense shown in the eminent clearness of the explanations, which are never tedious and obscure. The arrangement, too, is just what it should be. This is enough to give the work a distinct character."—*Boston Courier.*

"We are much pleased with this work. All previous treatises on this subject are rendered, in a great degree, unintelligible to beginners, by the confused manner in which the subjects following the simple rules are introduced. From a number of years' experience in teaching, we became convinced that a knowledge of the simple fractions, both vulgar and decimal, is indispensably necessary to every learner, to a successful prosecution of the study of arithmetic, after having become acquainted with the five elementary rules. For, after these rules, there are very few in arithmetic but what are based on vulgar fractions. In this work, fractions immediately follow the simple rules, and the work is arranged in such a way, that the various subjects follow each other in a natural and consecutive manner."—*Zion's Herald, Boston.*

"We mentioned this book the other day in a hasty way, for which our conscience, on second thought, reproaches us. The fact is, that in a country of universal education, or at least *schooling*, like this, a new school book is a matter of some moment. If bad, it is likely to do no little harm; if good, on the contrary, its sphere of usefulness is proportionally wide. The immense circulation of some of the arithmetics, particularly, is well known to our readers. We hope Mr. Leonard's book may be treated as well in proportion to its real merit, for of this we are satisfied. Brief and clear in its explanations, admirably arranged, full of just the practical information which the boys in the schools, all over the country, really want and really relish, it cannot fail to succeed. We have no space for a notice to do it justice in our columns, but we commend it heartily to the attention of committees and teachers."—*New York Comercial Advertiser.*

"The public is already in possession of several valuable arithmetics, the merits of which we are not inclined to deny nor depreciate; but we do think that the book in question combines their advantages, and besides, has peculiarities which render it quite superior to any other work of the kind."—*Bay State Democrat, Boston.*

"We are not in the habit of praising new school books. We distrust such notices for the most part. But few of the myriad treatises published in this land of universal schooling, are really worth one's powder —for there is as much of nutmeg humbug in this business as in most others. However, this is but preface to Mr. Leonard's book, which we feel bound to make an exception to common rules. It is itself an exception. We feel confident this work will have a great run; and what is more, that it deserves it. We have pride in seeing such books go from the Boston press. We trust something in this case to the report of those experienced in teaching; but to any reader's observation, the clearness, completeness, capital arrangement, and remarkable *practicability* of Leonard's book, must commend themselves at once. We earnestly hope it may meet a 'fair field,' and in that case it will need 'no favor.'"—*Boston Transcript.*

"The school books, not less than the schools, of Boston, have long been an honor to the city. Those of Pierpont, Bailey, Dillaway, Leverett, Felton, Colburn, Emerson, and many more, of our own generation, will occur to the reader in this category. To this list we now have a new name to add. Mr. Leonard has produced a sterling treatise—an Arithmetic just such as the common schools want; lucid, simple, complete, in an eminent degree, and so far as the real availability of its contents is concerned, far the most *practical* work of the kind—the best calculated for general popularity—for great usefulness, among farmers and mechanics especially, that we have ever seen. We are convinced, on the whole, by testimony to the worth of this work from sources at once disinterested and experienced, independent of our own examination, that it is destined to have what is called a *great run*—and still more, that it deserves it. Our columns are no place for a notice which would do it justice. But we cordially commend it to Teachers and Committees."—*Boston Atlas.*

"Its great advantages are, its simplicity, its most admirable arrangement, and its remarkable adaptedness to popular and practical use. For self-instruction particularly, and for the farmer and mechanic, we know of no treatise to be compared with it."—*Bangor Whig.*

☞ We are very desirous that this Arithmetic should be examined by all interested in Education, believing it will be found to be a superior work for Schools, Academies, &c., and also for Self-Instruction.

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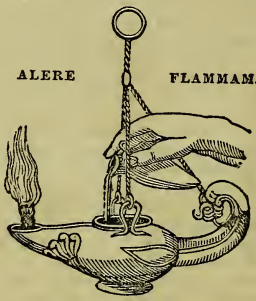

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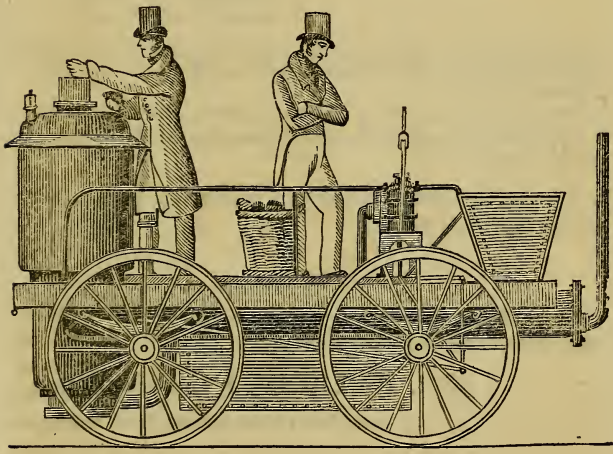

This work, which includes all that was published of the "YOUNG MECHANIC," is the Magazine which is noticed in the foregoing Memoir, and from which extracts are made in the Miscellaneous Papers.

It is intended to afford scientific information and practical instruction in the MECHANIC ARTS, in such a form as to be useful and acceptable to Manufacturers, Master Mechanics, Journeymen and Apprentices. A large number

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